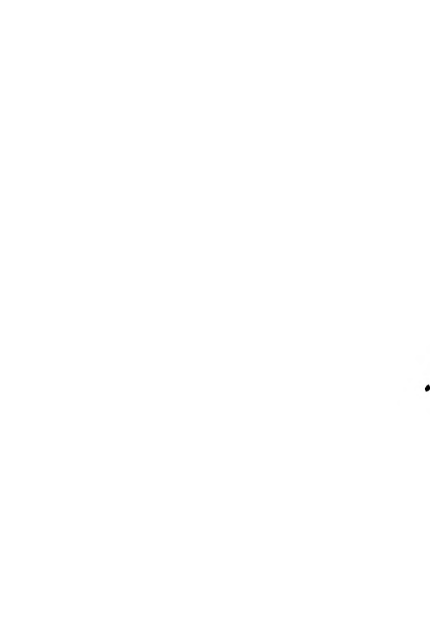


THE
Daily Express
ENCYCLOPÆDIA

VOL. V

GLAUBER TO LANDES



THE
Daily Express
ENCYCLOPÆDIA

*INCLUDING 3500 ILLUSTRATIONS
WITH ATLAS & GAZETTEER INDEX*



VOL. V
GLAU TO LAN

1934
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PRONUNCIATION

THE imitated pronunciations are intended to assist the reader in the enunciation of unfamiliar words, and necessarily, especially in the case of foreign words, only afford a rough approximation to the actual sound. The signs used are to be pronounced as follows.—

a	..	as a in hat	o	..	as o in not
ah	..	„ a in father	ō	..	„ o in note
ā	..	„ a in hate	u	..	„ u in but
ār	..	„ ar in hare	ū	.	„ u in tune
aw	..	„ o in more	ur	..	„ ur in lure
e	..	„ e in bell	oo	..	„ u in put
ē	..	„ e in bee	ōō	..	„ oo in boon
ēr	..	„ eer in deer	ou	..	„ ow in now
ē	..	{ e in herd, or	ū	..	„ a in comma
		{ i in bird	th	..	„ th in think
i	..	„ i in bit	dh	..	„ th in there
ī	..	„ i in bite	gh	..	„ ch in loch
īr	.	„ i in fire	zh	..	„ s in pleasure

Other consonants are given their ordinary English sound.

Glauber's Salt, the popular name for hydrated sodium sulphate $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$. It is used as a mordant in dyeing and medicinally as a purge. See also ALKALI INDUSTRY. **SODIUM**

Glaucoma, disease of the eye characterized by increase of intra-ocular fluid which accumulates, pushes the lens and iris forward and may destroy the retina with resultant blindness. When the disease occurs the fluid in the globe of the eye flows forward round the edges of the lens and then through the pupil into the anterior chamber of the eye where it is collected into a canal called the canal of Schlemm and led away. Rheumatic or gouty sufferers as well as those subject to mental strain and recurrent inflammation in the eyes are predisposed to this condition. The symptoms include rapidly increasing short-sightedness, coloured rings on looking at lights and flames and pain in the eyes and forehead. The eyes when pressed with the fingers are found to be unnaturally hard. The condition can sometimes be relieved to a certain extent by application of drugs and in other cases surgical treatment will produce a permanent cure.

Glauconite, hydrated silicate of iron and potassium. Found especially on the sea floor at depths of from 400 to over 1000 fathoms. It imparts the green colour to the sand and mud which has been dredged from those depths. It occurs in grains and small lumps and is derived from weathering of land deposits. It is a characteristic deposit on the Continental Shelf which jets out in many places into the ocean and slopes away gently for a considerable distance before plunging steeply to great depths.

Glauconite also occurs in many geological deposits such as the English Chalk, Rock and Chalk Marl and the Greensand and the Cambrian Comley Sandstone of Shropshire, but is rare in early deposits as it is liable to change into other minerals.

Glaux, a genus of plants belonging to

the primrose family (Primulaceae) of which one species grows in England. The sea milkwort is a fleshy marine plant 3-6 in. high growing in thick patches on seashore and saltmarsh. The leaves are numerous glaucous and egg-shaped and the flowers axillary and pink.

Glazebrook, Sir Richard Tetley (b. 1854), British physicist, born at Liverpool. Principal of University College Liverpool in 1898, he became Director of the National Physical Laboratory from 1899 to 1919. He was Professor of Aviation and Director of the Aeronautics Department at the Imperial College of Technology 1920-3. He was knighted in 1917.

Glamorg, see CERAMICS.

Glebe, land attached to an ecclesiastical benefice. It is the freehold of the incumbent but he may only alienate it under authority of the bishop of the diocese and the patron of the benefice. Some incumbents derive the greater part of their income from glebe.

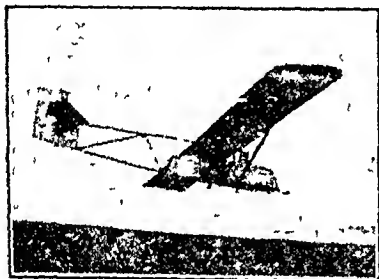
Glee, see MUSICAL TERMS.

Glencoe, a glen in Argyllshire, scene of the massacre of the MacDonalds. Reluctance to submit to the rule of William III led to a royal proclamation extending pardon to all who submitted before Jan. 1, 1692. Macdonald of Glencoe went to Fort William on Dec. 31, 1691, offering submission but the Governor was not authorised to receive it. He however gave him a letter to the Sheriff of Inverary who accepted Macdonald's oath of allegiance. William III issued an order for their extirpation and Campbell with 150 men entered the valley and after being hospitably received began to massacre the MacDonalds. This infamous treachery was only partially successful, for owing to bad weather most of the clan escaped. About 60 men were slain. Women and children were tumbled out on a freezing night and many perished. The man responsible was Sir John Dalrymple afterwards Earl of Stair, an enemy of the MacDonalds who obtained the order to extirpate that set of thieves by

withholding the information that the Maedonalds had offered allegiance William III is said to have signed the paper without reading it.

Glendower [GLINDUR'] (Glyn Dwr) Owen (c 1349-1415), last of the Welsh princes. In 1401-1402 he thrice defeated Henry IV's troops. He formed an alliance with Percy (Hotspur) and Mortimer against Henry of Monmouth, but they were completely defeated at Shrewsbury. With French aid, however, he gained Harlech and Aberystwyth in 1404, but lost them again in 1408 and 1409 respectively to Prince Henry.

Gliding, the art of flying an aeroplane by utilising air-currents and the



A Glider in motion

force of gravitation without any assistance from mechanical power. The configuration of the ground produces natural upward air-currents, and by alternately rising upon these and gliding with the pull of gravitation, long distances can be covered in light, specially constructed machines. Gliders must usually be projected from a high place, such as a hill-top, in the first instance. Gliding needs a more sensitive appreciation of the forces involved than does power flying, and thus provides a good training experience for the latter.

In the early days of aviation invaluable knowledge was contributed by the gliding experiments of Montgomery, Chanute, the Lihenthals, and others. There are many gliding schools and clubs, especially in Germany, where

gliding is a popular sport and subsidised by the Government to the extent of c £16,000 annually. The British Gliding Association now controls c 80 clubs. Expert gliders have remained many hours in the air, and have covered more than 100 m. in one flight, reaching over 8000 ft in height. Experiments have been conducted with gliders towed by power-planes or motor-cars.

Glinka, Michael (1804-1857), the first important Russian composer, and founder of the "nationalist" school. Wrote "national" operas based on Russian folk music, such as *A Life for the Tsar* (1838), and other works, which were an inspiring example to younger Russian composers.

Globe-fishes, marine and freshwater fish of the family Diodontidae, related to the sun-fishes (*qv*), from which they are distinguished by having a well-developed tail, and by part of the oesophagus being very distensible. They have cylindrical bodies generally covered with a scaleless skin bearing a number of spines, small in one group, the members of which are brilliantly coloured and inhabit rivers and brackish-water estuaries in Brazil, Africa and India, and large in a second group, found in the Atlantic and Indo-Pacific Oceans. Globe-fishes assume their globular form by swallowing air, which passes into the oesophagus and blows out the animal like a balloon. Some are poisonous if eaten. They feed on shell-fish.

Globigerina, *see* FORAMINIFERA

Globulins, a class of proteins characterised by insolubility in water, although they are soluble in dilute salt solutions. They possess acidic properties, and are denatured by heat. The separation of globulins from albumins, the class of proteins to which they are nearest related, is carried out by half saturating the solution containing them with ammonium sulphate, this precipitates the globulins, whilst the albumins remain in solution. Globulins occur both in vegetable and animal matter.

Glockenspiel, a set of tuned bells for use in bands and orchestras. The bells are struck by a hammer.

Gloriosa (bot.) African plant very popular in cool greenhouses needing little additional warmth but requiring protection from frost. The long thin climbing stems bear shiny handsome leaves and large red scarlet or brown flowers with reflexed petals and long filaments with big gold anthers.

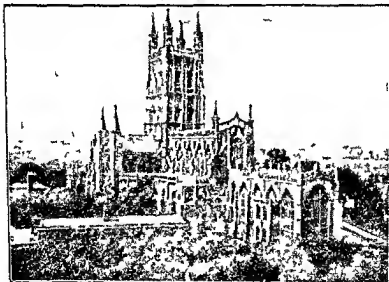
Glorious Revolution, the change in the succession to the English throne that occurred in 1688. James II had by his pro-Catholic policy aroused considerable opposition shown in Monmouth a rebellion and in the popularity of the Seven Bishops (q.v.) William Prince of Orange was invited to come over and take the throne. James II fled to France and the revolution was accomplished without bloodshed. *See also* Bill of Rights.

Glossie *see* SIMPLIFIED SPELLING

Glossop market town Derbyshire

Chief industries are cotton woollen and paper manufactures. In the neighbourhood are the Longendale reservoirs supplying the city of Manchester. Pop (1931) 19,500.

Gloucester Dukes and Earls of Robert (d. 1144) 1st Earl was a son of Henry I. The Clare family held the title from the beginning of the 13th cent until 1314 when Gilbert 9th Earl was killed at Bannockburn. In 1355 Thomas of Woodstock (1355-1397) youngest son of Edward III was made Duke of Gloucester but put to death while imprisoned on a charge of treason. Humphrey youngest son of Henry IV the next Duke was Protector until Henry VI came of age. Richard who later became Richard III was the most eminent duke. Later dukes of note were Henry (1639-60) son of Charles I. William (1689-1700) son of Queen Anne and William Henry (1743-1803) brother of George III whose son William Frederick died childless in 1834 the title again becoming extinct.



Gloucester Cathedral

The present Duke is Henry William Frederick (b 1900), third son of George V

Gloucester, county town of Gloucestershire, England, on the Severn. Its 11th cent Cathedral (restored 10th cent) is the chief feature of interest. There are railway works, a trade in iron, coal and agricultural produce, and salmon fisheries. Pop 52,937

Gloucestershire, a W county of England, lying between Berks, Oxon, Warwickshire, Worcestershire, Wilts, Somerset, Monmouth, and Herefordshire. It is hilly in the E and centre. The valley of the Severn lies to the W while in the angle formed by this river and its tributary, the Wye, lies the Forest of Dean, reputed to be the oldest forest in England. The head waters of the Thames lie within the county, the Cotswolds being the watershed, while the Stratford Avon and the Bristol Avon are other important rivers.

The two chief industrial centres are Bristol (*qv*), and Gloucester (*qv*), the county town. Coal is worked in the Forest of Dean and round Bristol. Limestone and freestone are quarried in the Cotswolds. A distinctive breed of sheep peculiar to the locality is reared, agriculture and dairy-farming flourish in the valleys, and there are large cider-apple orchards. Area, 1257 sq m, pop (1931) 785,656

Glow-worm, a luminous nocturnal beetle, in which the female is wingless, the male winged, and provided with large eyes. The luminous organ, situated at the end of the abdomen beneath, is present in both sexes, but more powerful in the female, which may frequently be seen in England on summer nights amongst the grass. The adult insects seldom feed, but the larvæ devour snails and slugs.

Glucinum, an alternative name for beryllium (*qv*)

Gluck [*GLOOK*], Christoph (1714-1787), German composer who established the principles of present operatic form in his operas, of which *Alceste* (1766), *Iphigénie en Aulide* (1774), and *Orphée* (1762) are the finest

Gluck studied music at Prague. He visited London in 1745, where he had two operas produced. In Paris he came into conflict with the Italian composer Piccini, who challenged his supremacy in opera by composing a setting of his own to *Iphigénie en Tauride*, which, however, was a failure, and resulted in the discredit of the Piccini faction. Besides his operas, Gluck composed symphonic and chamber music, ballets and songs.

Glucose (*Grape-sugar* or *Dextrose*) a crystalline carbohydrate (*qv*) belonging to the class of monosaccharoses. The anhydrous substance melts at 140°C, but it is more usually met with as the monohydrate, which has a melting-point of 86°C. Glucose occurs in nature in honey and in a number of fruits, is a constituent of diabetic urine, and is also found in combination in sucrose (ordinary sugar) and starch (*qqv*). It is by the hydrolysis of the latter that commercial glucose is manufactured. Glucose is used in the manufacture of confectionery, for the treatment of tobacco, and as a reducing agent. See also **BLOOD**

Glucosides, a group of complex, naturally-occurring organic compounds consisting of a sugar in combination with one or more other substances. The decomposition of glucosides occurs in nature by means of an enzyme which is present in the plant, it can also be carried out artificially by means of hydrolysis with dilute acids. One of the best-known glucosides is amygdalin (*qv*), which occurs in the kernels of fruits of the *Prunus* family, and contains hydrocyanic acid. Salicin, a glucoside occurring in willow bark, yields salicyl alcohol on hydrolysis. It is used in medicine as a mild antiseptic and also against rheumatism. A very important group of glucosides are the saponins (*qv*), which are industrially valuable on account of their emulsifying power, for this reason they are used in the manufacture of detergents.

The anthocyanins (*qv*), which are

responsible for the colours of a large number of plants are glucosides.

Glue *see* ADHESIVES BOVE PRODUCTS

Glutathione. This is a substance of the class known as tripeptides being a compound of three amino-acids (*qv*) glycine glutamic acid and cysteine which latter is an amino-acid containing sulphur. Glutathione is of great physiological importance owing to the fact that it has the property of undergoing reversible oxidations and reductions thus acting as an oxygen carrier. *See also* BIOCHEMISTRY

Gluten a protein belonging to the class of albumins (*qv*) which is found in a number of plants and more particularly in wheat. It is obtained from wheat flour by treatment with water in which gluten is insoluble. It is used in making biscuits and bread for diabetics and also in the manufacture of some types of confectionery.

Glutin, an alternative name for gelatine (*qv*)

Glutton, *see* WOLVERINE

Glycerides are esters of the fatty acids with the trihydric alcohol glycerol. Glycerides are of extreme natural importance since they form c. 99 per cent of all fats and oils. In fact, the terms glyceride and fat are often used interchangeably but this is not quite correct owing to the fact that all fats and oils contain small quantities (c. 1 per cent) of physiologically important unsaponifiable matter (*see* OILS FATS AND WAXES).

Glycerine or more correctly *Glyceol* is the basic constituent of all oils and fats (*qv*). It was discovered at the beginning of last century by the French chemist Chevreul (1785-1859) during his classical researches on the chemistry of the fats and named by him from a Greek word meaning sweet on account of its taste. Glycerine is obtained from fats and oils by hydrolysis usually in connection with the manufacture of soap (*qv*). It can also be obtained by the fermentation of sugar. The principal use of glycer-

ine is in the manufacture of the explosive nitro-glycerine from which dynamite is made. It is also used in printers' inks soaps and for pharmaceutical purposes. Its chemical formula is $C_3H_5(OH)_3$.

Glycine amino-acetic acid or glycocoll $CH_2(NH_2)COOH$ is an amino-acid (*qv*) which is widely distributed in natural products. It is a white crystalline substance melting at 234°C and having a sweet taste.

The term glycine is also applied to the odoriferous constituent of the plant glycine (*Nisaria sinensis*) and also to *p*-hydroxy phenyl glycine which is employed as a photographic developer.

Glycogen a carbohydrate (*qv*) found in the liver and muscles of animals chemically similar to starch. It is of considerable biological importance since it is one of the sources of muscular energy during the performance of work by muscles. Glycogen is degraded to lactic acid on resting; the process is reversed but at a much slower rate. *See also* MUSCLE BLOOD

Gnats *see* FLIES

Gneiss formerly denoted a granite or allied rock altered by metamorphism now applied to any crystalline rock showing a banded or streaky character brought about by alternating layers or patches of different composition.

Gneisses originate in three ways and are roughly grouped as primary gneisses ortho-gneisses and paragneisses. In *primary gneisses* the banding is an original character of the rock of igneous origin and was formed when the rock was still fluid or plastic. It is due to the different portions of a composite magma being drawn out in a flowing movement. The *Lewisian gneiss* of the NW Highlands of Scotland and the *Laurentian gneiss* in Canada are of this kind. The term *ortho-gneiss* should strictly be confined to rocks of igneous origin in which the banded structure has resulted from metamorphism after consolidation. Such gneisses are often

difficult to distinguish from primary gneisses, but in the absence of signs of pressure, a microscopical examination of the minerals contained will usually settle the point. *Para-gneisses* are derived from the metamorphism of sedimentary deposits, which they generally accompany. The metamorphism may be due to heat, pressure, movement, or simply recrystallisation of the constituent minerals.

Gnesen (Pol. *Gniezno*), a town in the province of Poscn, Poland. Its manufactures are lins and woollens, chiefly for wear in the vicinity. It is reputed Poland's most ancient town. The Gnesen Cathedral is of the 10th cent., and contains the tomb of St Adalbert, credited with being the first preacher of the Gospel in Prussia and Poland. The ancient Polish kings were crowned here. Pop. c. 29,000.

Gnosticism, a heresy which flourished in the early Christian period (3rd cent.). A compound of Christianity, Hellenic philosophy, and Eastern mysticism, it was concerned mainly with the origin of Evil and the nature of the Absolute. The Creator of the world, the Old Testament God, was not the True God, who was a being far removed from him. Evil comes in the process of creation, which is not immediately the work of the True God. Christ, sent from God to redeem man, was not ever actually man, and redemption can only come by liberation of the soul from matter. These are its main creeds. These doctrines had great vitality and often emerged in later heresies.

Gnu (or *Wildebeest*), the name of two species of large African antelopes characterised by their bushy tails and their horns, which are present in both sexes, and are bent downwards close to the head with the points turning up.



Gnu

The larger of the two species, the brindled gnu or blue wildebeest, grey in colour, with some brown stripes, a black-haired tail, and sloping croup, is mainly found in E. Africa. The smaller white-tailed gnu or black wildebeest, which is dark brown, with a white tail and humped croup, was formerly abundant in S. Africa, but is now nearly extinct.

Goa, town and principal colony of Portuguese India. Spices, salt, copra, fish, and coco-nuts are exported. In Goa itself there are over 500 salt works. The discovery of manganese in 1906 has resulted in the development of mining near Mormugão, 21 mines being active. The capital is Panjim, on the Malabar coast. Area, 1480 sq. m., pop. of entire colony (1931) 569,190.

Goat, the domestic animal derived from the common wild ibex (*qv*) of Asia Minor and Persia. Goats, the "poor man's cows," are in many countries valuable property, being hardy, inexpensive, and losing the gregarious instincts of the wild animal, contented and capable of looking after themselves anywhere. Their milk is rich, their flesh is edible, their hides yield good leather, of which "kid" and morocco are the best known, and the coat of some breeds, like the Angora and the Kashmir, is famous for its silky luxuriance. Goats can be kept in hot, wet climates where cows may develop tuberculosis, a disease almost unknown in goats.

Goats were first domesticated by the Neolithic lake dwellers. Many breeds have since been evolved, some differing profoundly from the wild ibex, especially in the length and quality of the coat. The horns, too, have been altered in shape or altogether suppressed, and the ears are sometimes overgrown and pendulous, like a spaniel's. Goats have been introduced into most countries of the world, and have run wild in many places where their browsing has greatly affected both flora and fauna. The barren hill-slopes of Greece and

Palestine are in places attributable to the wearing action of the goats sharp hoofs which loosen the soil so that it is removed by wind and rain. The splendid so-called wild goats of some parts of Great Britain and Ireland are all descendants of escaped domesticated goats.

Milk Goats milk used also for Gruyère cheese is a valuable food for infants and invalids being rich in butterfat and practically immune from tubercle. Goats are useful in rural districts where it is difficult to obtain small supplies of cow milk. A goat should be selected for the length of her milking period rather than for the quantity produced at any one time 100-150 gallons a year over a period of 10 months being a good average yield. Goats breed once or twice a year the period of gestation being 21 weeks. The pairing season lasts from Sept to Feb but mating should take place as early as possible so that the kids may benefit by the spring. The kids should be suckled for 3 months though many breeders rear them by hand. Surplus milk should be taken from the mother once a day and after the first 4 days is again fit for human consumption. When 1 month old the kids should be gradually weaned.

Milking should be regular and complete twice a day after the kids are weaned. To keep a goat in long lactation and obtain the last drops which are the richest the udder should be gently massaged towards the end of the milking.

Feeding During spring and summer browsing should be permitted on commons and along hedgerows rather than on rich pastures as goats will eat brambles heather nettles docks dandelions etc. and they may be given garden produce of all sorts hedge-clippings acorns and roots but foxglove hemlock privet laurel rhododendrons and yew are poisonous and sprouted potatoes may be harmful. Milking goats should have 2 or 3 handfuls of corn or cake daily and

through the winter lucerne or clover hay. Fresh clean water must be within reach and rock salt always available.

Goatsucker a familiar bird with several popular names such as night jar churn-owl fern-owl and wheel bird mostly derived from some peculiarity of its voice or appearance. Its most popular name based upon the belief that it has the habit of sucking goats is the least appropriate. The goatsucker is a summer visitor to Great Britain where it may often be seen at twilight hawking moths and cockchafer on silent wing. It some what resembles a small owl but is related to the swift which it resembles in its wide gape and delicate beak. It nests on the ground where with its mottled pattern and its shape it exactly resembles a piece of dead branch speckled with lichen. Its singular voice which can be heard for a couple of miles has been likened to the noise of a spinning wheel.

Gobelin, Jehan a dyer who set up a business in Paris in the 15th cent. which was carried on and developed by his family. The manufacture of tapestry was begun in the 16th cent. and made the family name celebrated throughout Europe. The business was taken over by Louis XIV in 1669 and the production of tapestry and furnishings was continued up to the time of the Revolution. After the restoration the industry was revived and extended to include the making of carpets and it is still maintained by the State at the present day.

Gobi Desert, part of what is known as Outer Mongolia called by the Chinese Shamo (sand sea). In area c. 300 000 sq m. it extends from the Altai Mountains on the W. to the Khingan range on the E. with the Kuen Lun and lower still in the S. the Nan Shan Mountains. To the N. are the Yablonoi Mountains.

The Gobi is not entirely a desert of sand there are stretches of verdure rock bound areas salt laden lakes grasslands and in the Ordos area

some animal life. Trees are rare, and vegetation coarse and infrequent. In the hilly N and N W, towards the border, grass is found and also trees. Rainfall is heavy here.

The existence of the sand desert is due to the high mountain ranges, the Ala-Shan and the Richthofen in the S and S E, which in parts reach a height of nearly 20,000 ft, thus intercepting rainfall. A few Mongol nomads are found in the meagre pasture areas. Towards the S E, however, monsoon moisture penetrates, and cultivation may, in time, become possible on a large scale. Several of the old caravan routes which cross the desert are still used.

Gobineau, Joseph Arthur, Comte De (1816-1882), French diplomat. He received his first public appointment as *chef de cabinet* in Tocqueville's Government. After Tocqueville's fall he was a diplomat at Berne, Hanover, Frankfurt, Persia (1854-8), Newfoundland, Persia again in 1861, Athens (1864), Rio de Janeiro (1868), and Stockholm (1872-7), after which he retired to Rome. He wrote extensively on ethnology, cuneiform, and other subjects, and published essays, short stories, novels, books on travel, and some verse. His first work was the *Essai sur l'inégalité des races humaines* (1853-5), a work to which may largely be traced the theory of the innate superiority of the "Nordic" peoples, and his best known is *The Renaissance* (1877), a series of historical sketches.

Godard, Benjamin (1849-1895), French composer. Studied at the Paris Conservatoire and composed operas, symphonies, and many songs. *La Vivandière* was the most successful of his operas. His light and charming pianoforte pieces (waltzes, mazurkas, etc.) are characterised by their attractively unexpected modulation.

Godfrey, Sir Dan (b 1868), English conductor, son of Dan Godfrey, bandmaster to the Grenadier Guards. He has been Director of Music to the Bournemouth Corporation since 1893.

The Bournemouth Municipal Orchestra was the first of its kind in England. He has given great support to English composers. He has conducted over 2000 Symphony concerts, as well as Grand Orchestras at Fancy Dress Balls at Covent Garden. He is President of the Bournemouth Dramatic Club, and a past President of the Bournemouth Art and Literature Society. Knighted 1922. In 1924 he published *Memories and Music*. He has written dance music, marches, and songs.

Godfrey of Bouillon (c 1060-1100), second son of Eustace II, Count of Boulogne. He was a leader of the First Crusade (see CRUSADES), reaching Constantinople in May 1097. He led the assault on Jerusalem, which fell in July 1099, and he became the first ruler of Jerusalem. He would not "wear a crown of gold where his Saviour had worn one of thorns," and instead took the title of Advocate of the Holy Sepulchre.

Godiva, Lady (d c 1080), wife of Leofric, Saxon Earl of Mercia. When Leofric imposed heavy taxes on the people of Coventry she secured their remission by riding naked through the streets. A story was added in Puritan times of one "Peeping Tom," who looked out in defiance of a proclamation ordering the people to remain indoors during the ride, and who was immediately struck blind.

Godolphin, Sidney Godolphin, 1st Earl of (c 1645-1712), English statesman, one of James II's confidants. He was First Lord of the Treasury under William III, and again from 1702 to 1710 under Queen Anne. The decline of Marlborough's influence at Court led to his dismissal.

Godunov, Boris Fedorovich (c 1552-1605), Tsar of Muscovy, elected Tsar in 1598 on the death of Theodore. The greatest of the Muscovite Tsars, he encouraged commercial and cultural relations with foreign Powers and re-colonised Siberia. His social improvements did not, however, extend to the lowest classes, and he introduced a tyrannical serf system.

Godwin (or Godwine) Earl of Wessex (d 1053) Saxon warrior created earl by Canute who held him in great regard. He secured the throne for Edward the Confessor who married his daughter. Although at first he wielded great influence his hostility to the Normans at Court led to his outlawry but he was later reinstated.

Godwin, Mary Wollstonecraft (1759-1797) English authoress wife of William Godwin (qv) wrote on the rights of women. Her books include *Thoughts on the Education of Daughters* (1787) and *Vindication of the Rights of Women* (1791). In 1791 she went to Paris where she lived as the wife of an American Captain Imlay. Returning to England she married William Godwin in 1797. She died soon after the birth of her daughter Mary afterwards the wife of Shelley.

Godwin, William (1766-1836) English author a friend of Coleridge, Tom Paine, Lamb and Shelley. His historical works include *Enquiry concerning Political Justice* (1793) and a *History of the Commonwealth* (1804-8). His best known novel is *Caleb Williams* (1794). He was a supporter of the French Revolution.

Godwit, a long legged long billed plover related to the sandpipers and ruffs. There are two British species the black tailed which formerly nested in this country but is now mainly a passage migrant and the bar tailed a passage migrant and winter visitor.

Goebbels, Josef (b 1897) Minister for Enlightenment and Propaganda in the German National Socialist Government. A journalist in the Rhineland in 1915 he became associated with Hitler's Nazi Party becoming Editor of *National Socialist Correspondence*. The following year he went to Berlin and became a district leader. In 1927 he joined the staff of *Angriff*. He has written a book and a play. He personally superintended the bonfire of banned books in Berlin shortly after Hitler took power in 1933. As Minister of Enlightenment and Propaganda he sees that all theatres broad-

casting stations newspapers and publishing houses present only officially approved amusement and instruction.

Goering Hermann, General (b 1893) Premier of Prussia Minister of Police and President of the Reichstag in the German National Socialist Government. He was born in Bavaria served in the German Air Force during the World War and joined Hitler in the early days of his movement. Following the unsuccessful



General Goering

Nazi Putsch in Munich 1933 he fled to Italy thence to Sweden.

With the rise of Hitler Goering returned to Germany. In Aug 1933 he was made a General of Infantry in the German Army.

Goes, Hugo van der (c 1440-1480) Flemish painter best known for his large triptych in the Uffizi representing the Virgin kneeling before her infant son. Life-size portraits of Tommaso Portinari and his family and figures of angels and saints painted for S. Maria Nuova. Other works include a *Madonna* at Frankfurt the diptych of the *Fall* and the *Descent* at Vienna and two panels at Holyrood Castle in Edinburgh. The last years of Goes's life were passed in a monastery near Ghent.

Goethe [GAYE] Johann Wolfgang von (1749-1832) German poet and dramatist studied at Leipzig where the wild student life undermined his health and at Strasbourg. Here he met Herder from whom he acquired a deep love of Shakespeare and he determined to replace the rigid classicism of recent German literature with a romantic naturalism. He

joined the *Sturm und Drang* movement, of which his first dramas, *Götz von Berlichingen* and *Die Leiden des jungen Werthers* (1774), were the most important productions. *Werther* was an immediate sensational success, and Goethe became one of the most important of European literary figures. Many other of his plays, sentimental, satirical, and biographical, were written at this time, and *Faust* begun. In 1775, Goethe went to live at the Court of Duke Karl August at Weimar. In 1786 he visited Italy. Henceforth the style of his work changed, and he returned to the classical ideal of form, as shown in his *Forquato Lasso* (1790). In 1796 *Wilhelm Meister's Lehrjahre*,



Goethe

a romance, appeared, and was a great success. His masterpiece, *Faust*, overshadowed all earlier works when it was published in 1831. Part I was written under the influence of the romanticism of the *Sturm und Drang*, and Part II under the classical influence of his Italian travels.

Goethe is also known as one of the finest lyric poets. His lyrics were addressed to the several objects of his love—Lili (Fräulein Schönmann), Frau von Stein, and to Christiane Vulpius, whom he married in 1806.

He was outstanding, too, in other departments of thought. As a scientist, he preceded Darwin with his theory of evolution, as a philosopher of the Spinozist school, he occupies no mean position, his *Wilhelm Meister* is of importance in the history of æsthetics (*q.v.*). It is his poetry, however—*Faust* and the lyrics, in particular—that has gained him the greatest fame of any German writer.

Goffering, *see* LAUNDERING.

Gog and Magog [MA'GOG], in the Book of Revelation, powers of evil which will become manifest at the end of the world. In Genesis and Ezekiel Magog is a place, possibly in Armenia where Gog will appear. Two gigantic figures at the Guildhall, London, are called Gog and Magog. They date from 1708, when they replaced the old paste-board figures, carried in the Lord Mayor's procession, which were burnt in the Great Fire of 1666. They may represent the giant Gogmagog (Göcmagot), who was slain by Corineus, an ancient British warrior, and who gave his name also to the Gogmagog Hills, outside Cambridge.

Gogh, Vincent Van, *see* VAN GOGH.

Gogol, Nikolai Vasilievich (1809–1852), Russian novelist and playwright. His first successful work was *Evenings in a Farm near Dikanka* (1831), stories of provincial life, in the same setting as his masterpiece, *Dead Souls* (1842). English translation, 1906. His most successful play, *The Government Inspector* (1836). English translation, 1891), was a satire on provincial bureaucracy.

Goitre, a condition in which there is an enlargement of the thyroid gland, giving rise to a swelling in the neck which sometimes reaches very large and unsightly proportions.

An infection of the water supply may play some part in producing this disease, but a deficiency of iodine in the diet also acts as a cause. Iodine is a necessary constituent of the hormone called thyroxin which is manufactured in the thyroid gland, and if supplies of iodine are lacking, then the output of the hormone will necessarily fall below normal. The body will therefore make demands upon the gland, which will then undergo enlargement in an endeavour to meet these demands. It seems clear that in certain cases there are toxins circulating in the blood which in their turn produce bad effects. Although the supply of iodine may not be under normal, yet the gland will enlarge and produce excessive amounts

of hormone which it discharges into the blood. This is called Graves disease and the eyes of those who suffer from it often become very prominent—a fact which has led to the other name for the disease exophthalmic goitre. These patients suffer from great disturbances of their nerves. They become very excitable and subject to palpitations in consequence of which they are liable to develop serious heart trouble.

Golconda, a city of India some miles W of Hyderabad. Its fortress and mausoleums are the only remains of its former greatness. The first named is used by the Nizam of the State as a store and prison. Its name is associated with great wealth and at one period diamonds were cut and polished here. It dates from the 16th cent.

Gold, a metallic element widely distributed over the globe. It is found in the native state (always however containing more or less silver) and also as gold telluride AuTe_2 , which is the only naturally occurring gold compound. Owing to its lustre and the fact that it occurs in the metallic state, gold was almost certainly the first metal known to man. Gold is found in nuggets which may attain a very large size; the biggest recorded was found in Victoria weighing over 180 lb representing a value (at present prices) in excess of £15,000.

There are several methods of extracting gold from the rocks and sand in which it is embedded (the production of gold from nuggets and free gold dust is small). If the metal has to be recovered from sand in river beds, this is usually accomplished by washing the matter with water; the lighter sand (density not above 3) is swept away by the water whilst the gold (density 19) is retained on the washing table. To ensure that no gold shall be lost the table is sometimes coated with mercury. This dissolves the gold forming an amalgam from which the precious metal can afterwards be recovered by distilling off the mercury.

In the case of gold recovered from auriferous rocks the latter are broken

into small pieces in stamp mills and the sludge that is obtained can either be treated with mercury causing amalgamation as above or can be mixed with a solution (0.3 per cent) of potassium cyanide the effect of which is to cause the gold (and silver) to enter into solution in the form of a double cyanide of gold (or silver) and potassium. This is run free from the residual rock and the gold is recovered by the addition of metallic zinc which takes the place of the gold in the double cyanide and the precious metal is precipitated out of solution. The cyanide process is used in S. Africa and the majority of the gold extracted is produced by this means. In cases where gold is extracted from gold telluride ores or from pyrites ores, use is made of the chlorination process which consists of roasting the ore so as to remove volatile constituents such as sulphur and arsenic. The ore is then wetted and treated with chlorine gas causing the formation of gold chloride AuCl_3 , which is removed by solution in water and the gold recovered by the addition of ferrous sulphate which precipitates the gold.

The gold obtained by the methods described above is more or less impure and has to be refined before it can enter into commerce. There are several refining methods available. The gold may for example be separated from the silver and other metals by treating with nitric or sulphuric acids in which the gold is insoluble. If the crude gold to be treated contains more than 33 per cent of the metal the silver present will not dissolve and it is therefore usual to add silver to the crude metal in order to bring the proportion of gold below this figure.

Another method of removing silver and other metals is to pass chlorine through the molten metal. Silver and the other metals form chlorides which are either volatile or else float on the surface of the bullion whilst gold chloride is unstable at temperatures above 200°C. and thus cannot be formed. The refining of gold by

electrolysis in a solution of gold chloride is also carried out. This gives a very pure product, and has the advantage that any platinum contained in the gold is recovered in the slime at the bottom of the electrolytic cell. In a similar manner considerable quantities of gold are recovered from the anode slime occurring in the electrolytic refining of such metals as copper and silver, and in the refining of lead. The chief source of gold to-day is the Transvaal, other important producing countries being Australia, India, New Zealand, the United States, Canada, and the U.S.S.R. In Europe, gold is still produced in Transylvania and in Wales. The total world production of gold in 1932 was of the value of £101.5 millions (gold), representing a quantity of c. 750 tons.

Pure gold is a bright yellow metal possessing a characteristic brilliance. The physical constants of gold will be found in the article ELEMENTS. Gold is an extremely malleable and ductile metal, gold leaf can be obtained in thicknesses of only 0.00001 mm. Such leaf, if examined by transmitted light, is green. One gramme of gold can be drawn out into a wire nearly 2 m. in length, thus showing the extreme ductility of the metal. Gold is an extremely good conductor of both heat and electricity, coming after silver and copper in this respect. It can be obtained in the colloidal form by striking an arc between gold electrodes under water, and also by chemical methods, the colour of the solution can be made to vary with the size of the gold particles, the largest giving a blue colour, going to yellow with decreasing size, by the absorption of colloidal gold on colloidal tin oxide, a purple pigment called *purple of Cassius* is obtained, which is used in colouring glass. The method of preparation is to add a solution of stannous chloride slowly to that of a gold salt, this is used as an extremely delicate test for the presence of gold. Pure gold is an extremely soft metal, and is hardly ever employed as such, but is usually

alloyed with some other metal in order to harden it.

Numerous alloys of gold are commercially used. The now withdrawn British gold coinage consists of 91.7 per cent gold and 8.3 per cent copper, this giving the alloy a redder colour than that of pure gold. The use of silver in place of copper was favoured by some countries, with the result that the alloy became nearly white in colour. An alloy of gold (78 per cent.) and aluminium (22 per cent.) is of interest on account of its beautiful purple-red colour, it is probably a definite chemical compound of the composition AuAl_2 . Alloys with iron, platinum, and zinc are used in jewellery. The purity of commercial gold is in England expressed by the carat system, gold of 24 carats being the pure metal, thus 22 carat gold (coinage) contains 22 parts of gold and 2 parts of a baser element. Abroad, the system used for grading gold is to state the parts of pure gold present per 1000.

The principal uses of gold (almost always alloyed) to-day are the same as they were in antiquity, namely, for the manufacture of jewellery and decorative objects, and as a medium of exchange. Gold is particularly suited for these purposes, since it is rare, and thus expensive, it is heavy, and thus gold to a great value need occupy but little bulk. It is chemically unattacked except by one or two compounds, such as free halogens, *aqua regia* (qv) (containing free chlorine), and selenic acid, and it therefore remains unaffected by any conditions it may encounter in normal intercourse outside a chemical laboratory. Gold is also used in dentistry as a crown for defective teeth, as a decorative medium in the form of gold leaf, and by electro-deposition and in gold paints.

Compounds of Gold. These are industrially unimportant in comparison with the metal itself. Certain gold salts, such as the double chloride with potassium, are used in photography to give a purple tone to prints, the double cyanide with potassium is

of importance in the extraction of gold (see above) and also in gold plating.

Several gold compounds are used in medicine chiefly for the treatment of tuberculosis and of leprosy. See also ELECTRO-PLATING. ELECTRO-TYPING.

It may be noted that an account of the economic and commercial position of gold to-day as well as a description of gold mining is given in a supplement to the *London Times* for June 9 1933.

Gold Bullion Standard. A country is on the gold bullion standard when its currency is convertible into gold bullion only and not into gold coin. Virtually this means that gold will only be demanded from the central bank or other authority when it is wanted for export because it is withdrawable from the bank in exchange for currency notes only in large amounts. For example in Great Britain (between April 1925 and Sept. 1931) under the gold bullion standard the minimum amount obtainable from the Bank of England in exchange for Bank of England notes was a bar of gold weighing 400 oz. and worth £1557 10s. Between 1816 and 1914 (except for a few short periods) Bank of England £6 notes and larger notes were virtually convertible at the Bank of England for gold coins. At that time Great Britain was on the gold coinage standard or the *Gold Standard* (qv) as was the United States until April 1933 though in the United States gold coins were practically not in circulation except at Christmas time or during the period of gold hoarding in 1929 and 1933.

Gold Coast, British crown colony and protectorate W. Africa on the Gulf of Guinea including Ashanti territories in the N. Its products are cocoa copra palm oil rubber manganese mahogany gold and precious stones. It imports machinery motor spirit cotton piece goods and tobacco the main exports being cacao and gold. Among the many schools and colleges is the Prince of Wales's College at (1935) The

Gold Coast is administered by a Governor and Legislative Council. The capital is Accra. In 1918 the first Gold Coast harbour was opened at



Avenue of Royal Palm, Aburi, Gold Coast.

Takoradi. Area 78 800 sq. m. pop. (1931) 3 100 000.

Golden Bull, any charter sealed with a gold seal. The most important is the Golden Bull of the Empire (1356) drawn up by Charles IV. regulating the election of emperors and giving certain privileges to some States of Germany. It increased their power at the expense of the Emperors and that of other electoral States. Other well-known Golden Bulls are those of Hungary and Milan.

Golden Fleece, see ARGONAUTS.

Golden Gate, a strait in California 6 1/2 m. wide extending from San Francisco Bay to the Pacific Ocean.

Golden Horn, a narrow inlet of the Bosphorus dividing Constantinople (qv) from Pera and Galata.

Golden Moles, a family of Insectivora (qv) so-called from their resemblance to the true moles in their burrowing habits and from the colour of the hair which has an iridescent or metallic lustre. They are found only in S. Africa. They have no external trace of eyes ears or tail but have a horny shovelling snout and the 2nd and 3rd claws of the forefoot enlarged for digging. They are generally 6 1/2 in. long but may be twice that length.

Golden Number Number indicating

the place of a given year in the cycle of 19 years, at the end of which the phases of the Moon correspond within an hour to their appearance 19 years before, it was invented by Meton the Athenian, and was adopted in 433 B.C. The Golden Number, used to determine the Epact and the date of Easter, is so called because in old almanacks it was marked in letters of gold.

Golden Rod, a plant of the order Compositæ, which grows wild in dry woods, and of which several species are commonly cultivated. The plant is erect, sparsely branched, 2-3 ft high, with roughish angular stems, simple saw-edged leaves which gradually become narrower up the stem, and conspicuous terminal clusters of bright yellow flowers. In gardens, golden rod requires lifting and replanting every 3-4 years, and is propagated by division of roots in Oct or April.

Gold Exchange Standard. As used at present this term generally means the system by which a country with a note currency backed by gold allows its central bank to keep a certain proportion of its "gold" reserves which it holds as a backing for currency notes, in the form of funds in the currencies of countries on the gold standard, instead of requiring the total reserve to be held actually in gold. When a large number of countries stabilised their currencies on a gold basis after the World War, it was thought that the supplies of gold were not sufficient to furnish gold reserves for all central banks, and many countries adopted the gold exchange standard in order that gold might be economised. Thus Germany, Holland, Austria, and a number of other countries, and, for a while, France, kept part of their reserves in the form of dollar funds in New York and £ funds in London, etc. A great blow to the gold exchange standard was given when Great Britain suspended the Gold Standard (g.v.) in 1931 and a number of central banks suffered heavy losses by the fall in the gold value of sterling. Practically all countries have now substituted full

gold reserves for part gold and part gold currencies, though formal changes in statutory provisions have not in all cases been made.

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Gold Mining. Gold is a very widespread metal, but its occurrence in

sufficient quantities to make extraction payable is now not common since most of the easily won alluvial deposits have been found and exhausted. It occurs in sea water as much as nearly a grain per ton having been found but no successful method of obtaining it profitably has been discovered. Payable quantities are found only in quartzite rocks and in the sands derived from them by weathering. The gold occurs in the quartz in the form of invisible veins more or less heavily charged with gold and occasionally large nuggets of gold have been found in alluvial deposits.

The primitive method of separating gold from alluvial deposits is known as *panning* and consists in placing the deposit in a pan and repeatedly swirling it round with water thus gradually washing away the lighter minerals. Large-scale working is often carried out by dredging and concentrating on tables the amalgamation of the gold by means of mercury is also much practised. When the deposit is suitably situated it may be broken up and washed down by powerful jets of water (*Hydraulic Mining*) the mud or pulp thus produced being washed over a long series of sluices in which horizontal bars or riffles are placed to obstruct the flow the gold settling behind them often with the assistance of mercury to retain it.

The winning of gold from quartz rock is carried out by methods similar to those employed with other mineral ores (see *ORE DRESSING*) the rock being pulverised until recently by means of stamp batteries but now more commonly by other machinery (see *CRUSHING AND GRINDING*). In order to extract the whole of the gold it is necessary to reduce the ore to an exceedingly fine state of division this operation being generally performed by means of tube mills.

At one time amalgamation was used to extract the gold but this resulted in only a 60 per cent being won, until the use of the cyanide process in 1889 MacArthur and Forrest greatly in-

creased production powers. The ore is crushed with a dilute solution of potassium or sodium cyanide which dissolves the gold under the action of atmospheric air the liquid becoming alkaline from the formation of caustic soda and the gold becoming converted into a cyanide which forms a double salt with the potassium cyanide. It extracts all but 1 or 2 per cent of the gold.

The solution of cyanide containing gold is filtered as a rule though it is sometimes separated by allowing the solid particles to settle. It is then freed from air by subjecting it to a vacuum so that the air dissolved by the liquid in the course of the previous operations is removed. The gold is then thrown down by bringing the solution into contact with metallic zinc dust when the zinc being a more electro positive metal than gold (see *ELECTRO-CHEMISTRY*) displaces the gold from the solution. The gold is recovered in the form of a very finely divided black slime which is filtered off from the cyanide liquor the latter being returned to the plant and used again. The gold slime is reduced to the dry condition and melted to the metal which however is impure. It is nowadays usually refined by blowing chlorine gas through it when molten a process somewhat analogous to the bessemerising of cast iron (see *IRON AND STEEL*). Silver and all the base metals are converted into chlorides while the gold is not attacked. Gold can also be refined in the same way as copper by electrolysis.

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to Conquer is one of the finest comedies in the language



Oil: Goldsmith.

numbered Burk Boswell etc among his friends and appears frequently in Boswell's *Life of Johnson*. He was personally an attractive and slow in speech.

Goldsmiths' Work. Gold has been valued as a precious metal eminently suit-

able for the creation of beautiful objects from ancient times. The Egyptians were cunning workers in this metal and produced many beautiful examples of engraved and jewelled golden ornaments. The engraving of gold was practised with mastery by the Assyrians and the Greeks excelled in gold beating and repoussé (qv) work and the extremely delicate fashioning of wire ornament. Some fine silver work also remains to prove an equal proficiency on the part of the Greeks in handling the less precious metal. The work of the Mycenaean era is unique while the vessels taken from Etruscan tombs include some fine examples of granulated and filigree work. A more eclectic style not unnaturally characterises the work of the travelled Phoenicians who were influenced in their design by the Greek, Egyptian and other races with whom they had dealings. Celtic gold individual in design and of a remarkably high standard of craftsmanship is dealt with in greater detail in the article on **JEWELLERY** where later periods are also discussed.

By the time of the Middle Ages the goldsmiths had become an important body of craftsmen and their work continued to flourish until the Reformation when however it was discouraged as being antipathetic to the

ideals of Puritanism and a great deal of actual destruction of irreplaceable ecclesiastical plate was wantonly indulged in. On the Continent of Europe the art of goldsmiths had by now reached a very high pitch of excellence particularly in Italy where from mediæval times to those of the Renaissance a growing mastery in the fashioning of ecclesiastical and other plate had been attained which reached its apex in the work of Benvenuto Cellini (qv). Other famous Italian goldsmiths were Guardimagli and Caradosso. A much earlier example of ecclesiastical work than that of any of these artists is the gold cross of Justin II and Sophia in St Peter's Rome which dates from the 6th cent. In France also some beautiful examples of early ecclesiastical work are extant though a similar vandalism to that practised in England at the Reformation characterised the French Revolution. A magnificent piece of 14th-cent. French secular plate—a gold cup with episodes from the life of St Agnes depicted on it in enamel—may be seen in the British Museum. The 18th cent. saw some of the best work by French goldsmiths and silver-smiths whose styles affected to a greater or less degree those of other European metal workers. Some beautiful pieces of enamelled gold (enamel having been an art excelled in by French metal workers since the days of mediæval Limoges) are typical of this period.

Gold Standard. The A country is on the gold standard when its currency is convertible into gold of a legally fixed weight and fineness per unit when its central bank treasury or other authority undertakes to buy any gold offered it or sell any gold bid for at legally fixed prices and when gold is allowed to be imported and exported freely.

Like most economic systems the gold standard developed because it was found useful. It has two aspects—internal or national and international. Nationally it provides a currency of

gold export point, and the rate at which it is profitable to ship gold from France to England, the gold import point. The difference between each of these points and the par of exchange depends upon (1) freight charges, (2) insurance premium, and (3) loss of interest during transport of gold. The rates of interest in the two centres therefore influence the gold points. Normally the gold points of the pound against the franc are c 123 80 and 125 62, par being 124 21 francs to the pound. In the case of the pound in relation to the dollar, the gold points may be c \$4 88½ and \$4 84½. When the gold standard is in operation, rates of exchange will not vary beyond the gold points. See also GOLD STANDARD, THE.

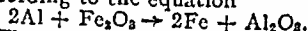
Gold Reserves, the amount of gold held by a country in the State or Central Bank as a backing for the note issue and general credit transactions. In 1909 a committee of the London Chamber of Commerce recommended a more conservative policy in the basing of huge credit systems on small stocks of gold. British gold reserves fell steadily though slightly from 1896 to 1914, but continental countries built up large reserves in anticipation of difficulties. Throughout the World War the flow of gold was from Europe to the United States, and this movement continued, though after the stabilisation of the franc France also began to attract gold. In 1928 the entire British note issue was transferred to the Bank of England, and the fiduciary issue limited to c £260 millions. Of this c 35 per cent is normally backed by gold. In 1931 the withdrawal of foreign credits from London and the freezing of English credits abroad caused a dangerous depletion of the gold reserve, which finally forced Great Britain off the gold standard.

The world's stock of gold is estimated at c £4,000 millions. The distribution of gold reserves in 1919 and 1933 was approximately.

Country	1913	1920	1932
United States	265	504	831
France	140	164	600
United Kingdom	35	157	121
Switzerland	7	21	98
Spain	19	98	90
Holland	13	53	85
Belgium	10	11	74
Russia	162	30	65*
Italy	50	42	63
Argentina	46	97	51
Japan	14	114	44
Germany	61	53	43
India	26	24	33

* 1931

Goldschmidt Process (also known as the "Thermite" process) is the method of reducing metallic ores with the help of aluminium powder, of value for the production of small amounts of molten steel for repairs, such as the maintenance of tram-rails. On igniting a mixture of aluminium powder and iron oxide, the aluminium burns with intense heat, utilising the oxygen of the iron oxide and liberating liquid iron, according to the equation



The thermite process is also used in the production of chromium, manganese, and other metals. The aluminium powder is usually ignited with magnesium ribbon. See also ALUMINIUM.

Goldsmith, Oliver (1728-1774) Irish author, wrote brilliantly though oppressed by poverty throughout his life. For 3 years he wandered on the Continent, supported solely by his flute. In England he was a chemist's assistant, and an usher, before, in 1758, he became a bookseller's hack. His essays in the *Bee* and his *Citizen of the World* at last made him known. *The Traveller* (1764) was his first notable work. *The Vicar of Wakefield* (1766) and *The Deserted Village* (1770) followed. The former is perhaps his best-known work. But his greatest claim to fame lies in his comedies, *The Good-natur'd Man* (1768) and *She Stoops to Conquer* (1773), which set a new style in reaction against the "sentimental comedy" then prevalent. *She Stoops*

to Conquer is one of the finest comedies in the language Goldsmith



Oliver Goldsmith.

numbered Burk Boswell etc amongst his friends and appears frequently in Boswell's *Life of Johnson*. He was personally unattractive and slow in speech Goldsmiths Work. Gold has been valued as a precious metal eminently suitable

for the creation of beautiful objects from ancient times. The Egyptians were cunning workers in this metal and produced many beautiful examples of engraved and jewelled golden ornaments. The engraving of gold was practised with mastery by the Assyrians and the Greeks excelled in gold beating and repoussé (q.v.) work and the extremely delicate fashioning of wire ornament. Some fine silver work also remains to prove an equal proficiency on the part of the Greeks in handling the less precious metal. The work of the Mycenaean era is unique while the vessels taken from Etruscan tombs include some fine examples of granulated and filigree work. A more eclectic style not unnaturally characterises the work of the travelled Phoenicians who were influenced in their design by the Greek Egyptian and other races with whom they had dealings. Celtic gold is individual in design and of a remarkably high standard of craftsmanship is dealt with in greater detail in the article on JEWELLERY where later periods are also discussed.

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medium of exchange, in which people have confidence and which they will accept in payment for goods and services, even though a large part of the actual currency may be only paper notes, because the notes are convertible into gold. For national purposes only, however, almost any token of value may be quite practicable so long as it is not issued in too great quantities, and provided there is confidence in it, silver, paper notes, which are not convertible (such as those now actually in circulation in Great Britain) and for small payments copper coins, etc (see MONEY)

A much more important use of the gold standard lies in the fact that it affords a common measure for the varying units of currency of all countries on that standard. When it is in operation the relation of the pound sterling to the dollar, the franc, the mark, etc., and their relation to each other is practically fixed by the actual amount of pure gold each of the various units contains or represents. The pound sterling contains 123 27 grains of pure gold, the dollar 23 2 grains, the franc, since 1928, 65 5 milligrams, 900 fine, the mark 36 grammes, etc. On this basis the pound sterling is worth, at par, \$4·8665, 124 21 francs, 20 43 marks, etc.

The stable relation between the various currency units of most countries of the world proved a great help to international trade during about half a century before the War, because traders could be sure that when they sold goods to foreign countries, especially if they gave credit to their customers, they would receive in payment the amount originally fixed in the contract made, whilst the buyers knew that they would have to pay neither more nor less in the terms of their own currencies than they agreed to pay when they decided to purchase the goods. Thus their calculations of what they could afford to pay, or of the price at which they could make a profit, were not upset by variations in the rates of exchange between currencies.

The reasons why rates of exchange fluctuate when the gold standard is not in operation must next be examined. Suppose that American producers sell to foreign traders more than American importers buy from foreign countries, American exporters naturally want dollars in payment for their goods, while French exporters want francs, German exporters want marks, and English exporters want pounds sterling. But if America sells more than she buys, there will be more merchants trying to buy dollars with which to pay for the goods they have bought in the United States than there are American importers trying to buy francs, marks, and pounds, etc., with which to pay for the goods they have bought abroad. The result will be that, because of competition to buy dollars on the foreign exchange markets, and of the supply being too small to satisfy all buyers, the value of the dollar in relation to other currencies will rise. The relation between the currencies is not kept stable unless the gold standard is in operation. In other words, it is here that the gold standard functions to keep the rates of exchange within narrow limits (see GOLD POINT).

As soon as a country's currency is no longer on the gold standard, its value in terms of the currencies of other countries begins to vary from day to day. The fluctuations are accentuated by speculators who buy and sell large amounts when they think the value is going to go up or down respectively. This causes much inconvenience to traders (see EXCHANGE EQUALISATION ACCOUNT). For example, during the year 1932, the pound sterling fluctuated in terms of the dollar from \$3 14½ to the pound to as high as \$3 83½, and in terms of the French franc between 80 and 97 francs to the £. Whereas when on gold in 1930, the rates only varied between \$4 88½ and \$4 85¼, or 124 34 and 123 50 francs.

The next step in the system is as important as that last described. It is the step which has not worked successfully since the return to the gold

standard after the World War. It is obvious that a country cannot keep on shipping gold to pay for the extra goods it buys. Its gold reserves are limited and if there are not enough exports to pay for its imports its reserves will disappear and the process will have to come to a end. The gold standard worked quite well for about half a century before the World War because on the whole no country in the long run did sell more than it bought or buy more than it sold (i.e. when shipping and banking services loans etc. are taken into account: see BALANCE OF PAYMENTS). In other words international trade was in balance. The payments into and out of each country over a long period came fairly near to balancing so that small shipments of gold back and forth sufficed to fill the gaps when trade balances were not in equilibrium.

Not only were the gaps in the balances small but the shipment of gold from one country to another actually set up influences which tended to slow down the exports of the country selling too much and the imports of the country buying too much at the same time speeding up the imports of the country buying too little and the exports of the country selling too little. These influences were partly automatic and partly the deliberate policy of the central banks. Both automatic and deliberate influences worked through the *Money Markets* (see MONEY MARKET). In the article just referred to it is explained how the quantity of credit and the rates of interest on loans affect prices. Here it is sufficient to state that when the gold reserves of a banking system are increased more credit can be lent by banks to commerce. The larger supply of funds thus available makes interest rates fall. This tends to make prices rise as explained in the article on the MONEY MARKET. The converse is true when gold is taken away from a financial centre prices tending to fall. When prices in a country are low it becomes a good place to buy in and a bad place to sell

in—and conversely when prices are high in a country that country becomes a bad place to buy in and a good place to sell in. Thus when gold was shipped for example from Germany to England because Germany had not sold enough goods to England to pay for what she bought here these influences tended to diminish exports from England to Germany and stimulate exports from Germany to England until equilibrium in the balance was restored. The balance need not be in equilibrium between any two given countries. Germany might sell less to England than she bought from her but she might sell more to France and France might sell more to England. What mattered was that each country should keep the balance between what she sold to foreign countries in general and what she imported from all countries.

The reasons for the breakdown in the post War gold standard system were

(1) The exchange of goods and services between countries became greatly unbalanced after 4 years of conflict and the gaps to be filled were so large that the shipment of sufficient gold to balance trade between nations depleted the gold reserves of some countries to the danger point and filled the cellars of central banks in other countries far beyond their needs.

(2) Beside the great gaps caused by the fact that trade between the various countries of the world was so greatly out of balance large international payments had to be made in the form of *Reparations* by Germany to the Allies and *War Debts* and interest thereon by the Allies to England and by all to the United States.

(3) To a considerable extent both the automatic and the deliberate influences set in motion by gold shipments before the War to bring trade balances into equilibrium were interfered with by new factors for example high tariffs in the United States the country receiving gold which should have been rendered a

good place for selling and a bad place for buying, made that country a most difficult market to enter, while mass-production methods enabled American producers to sell more and more abroad. Highly developed trade unionism in Great Britain made it practically impossible to bring down wages, and hence costs and prices of exportable goods, when gold was shipped to London. Large floating funds, especially belonging to the French Government and French banks and individuals who had put their money in foreign banks before the fraud was stabilised, tended to flow to the countries where interest rates were high, so that a high bank rate in London, which formerly would have tended to bring down prices in England, resulted in attracting more funds to London, thus largely counteracting the usual effects of a rise in interest rates.

As a result of these new factors, and of unwise over-lending of long-term capital, chiefly by New York, international trade became more and more out of balance. Indeed, the balance of payments of Central European countries was so disturbed that it would not have been possible for them to stay on the gold standard at all had it not been for big loans made to them, especially by the United States. These loans filled the gaps for a while, but they only put off the evil day, and made the final reckoning all the worse, because a loan, unlike a payment for goods sold, has to be paid back some day, and moreover, interest must be paid on it periodically. When Americans began to realise that Germany and other Central European countries could not export enough to pay this interest and refund the loans as well as to pay for the goods they imported, Americans ceased lending abroad, the gap in the balance of payments was no longer filled, and many countries had to restrict their imports drastically and later to restrict the movement of funds and foreign exchange. Had it not been

for the overwhelming fear of another inflation period like that in Central Europe just after the War, these countries would have forsaken the gold standard completely. Instead, most of them remained nominally on gold, but actually they do not fulfil the three conditions set out above, because they have placed restrictions, not only on gold exports, but on exchange transactions. Later, even England had to suspend the gold standard, partly because her balance of payments was not in equilibrium but chiefly because foreigners who held large sums on deposit in London suddenly withdrew them rapidly. This took gold from London so fast that soon there would have been none left.

History Because they are compact, valuable, indestructible, and easily divided into parts, metals have been used for money from the earliest days. Gold and silver, being the most valuable, became the most important. In the 18th cent they were both widely used by most Western countries. Gradually it became clear that a single standard of value was better than two, and gold became the principal standard in England. In 1816 Great Britain adopted the gold standard by law. On the Continent silver was more predominant, but in 1867, at an international conference held in Paris, gold was established as the standard for co-ordinating the currency values of the countries in the Latin Monetary Union formed at the conference. In 1871 Germany replaced the silver standards of the various German States by a gold standard. Two years later the United States established the gold dollar as the standard for her currency. In 1875 the Scandinavian Monetary Union was formed, and a gold standard for its constituents established. Austria-Hungary joined the Gold Standard Group in 1892 and Russia and Japan in 1897.

Many people believed that a double standard in which both gold and silver

played a part would work if adopted internationally—silver being valued at $\frac{1}{16}$ of gold (or at the ratio of 16 to 1—or 15½ to 1 see Bimetallism). Efforts to establish international bimetallism were made by believers in the system at conferences in 1878 1891 and 1892 but Great Britain and Germany refused to leave the gold standard. By 1890 the greater part of the Western World India and Japan were on the gold standard China remained on a silver standard as it does to-day.

Even before the majority of countries had adopted the gold standard it was playing its part with considerable effect, because it was established in Great Britain and the London financial market was largely financing the world's trade. London was a free market and all knew that if they were paid for goods they sold to customers in any country in sterling they could always get gold. Thus to a considerable degree London controlled the gold standard system before the War. Many countries even after formally adopting the gold standard allowed gold to be exported freely only in theory actually making it difficult for dealers to obtain gold for export. Nevertheless when there were signs that gold should be flowing from such a country the authorities generally took steps to correct the balance of payments. Thus though London the United States and India were the only absolutely free gold markets the gold standard functioned with considerable smoothness under the guidance of London and the Bank of England.

During the War restrictions on the export of gold were set up by practically all the belligerents and the gold standard was practically abandoned by all but the United States. Later neutral countries followed. After the War one of the first aims of statesmen and financial authorities was to restore the gold standard. Great Britain restored it at the pre War parity in 1925. Other countries followed and by

1928 the gold standard was virtually restored.

As explained above general trade conditions war debts reparations tariffs and other factors rendered the gold standard impotent in the performance of its task to right the disequilibrium of trade balances and so it has largely broken down under the strain. This time England led the way off the gold standard as she had led the way to it twice before in history—in 1816 and 1925. In Sept 1931 she was forced to suspend the law which compels the Bank of England to sell gold at a statutory price. Almost immediately Sweden Norway and Denmark followed while all of the British Empire (except S Africa until Dec 1932) followed sterling. Japan next abandoned gold as later did many S American States. Finally in April 1933 the United States Government declared an embargo on gold shipments ceased to convert currency into gold and in May passed a law abandoning the gold standard. France Belgium Lithuania Italy Switzerland and Holland remain on the gold standard and a few small Central American States while Central European countries though nominally still on gold are virtually outside the system since they have placed restrictions on gold shipments and foreign exchange.

The following figures of production and value are issued by the Washington Bureau of the Mint

Year	Mt	Fine Oz.	Value
1904	18.4	350	
1910	22.0	433	
1915	22.7	470	
1920	19.1	353	
1921	18.0	350	
1922	15.6	319	
1923	17.8	363	
1924	19.0	393	
1925	19.0	393	
1926	19.3	400	
1927	19.4	402	
1928	19.7	407	
1929	19.8	408	
1930	20.3	417	

The value of production for the year 1930 was divided as follows

Country	\$ Millions
Union of South Africa	221.5
Canada	43.6
U.S.A.	43.4
Russia	20.7
Mexico	13.9
S. Rhodesia	11.3
Australia and New Zealand	9.6
Other countries	52.8
Total	416.8

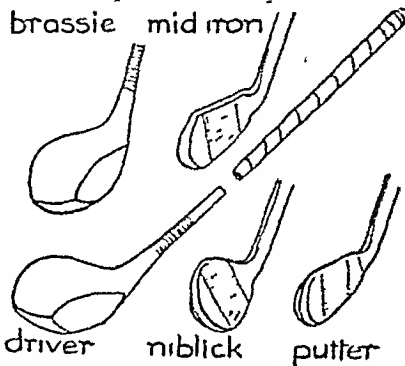
See GOLD BULLION STANDARD, GOLD EXCHANGE STANDARD, BI-METALLISM, MONEY, MONEY MARKET, BALANCE OF PAYMENTS, REPARATIONS, WAR DEBTS, INFLATION

Golf (Dutch, *kolf*, "a club"), a game in which a small hard white ball is struck with clubs into a series of small holes in the fewest possible number of strokes. Though probably of Dutch origin, the game was for centuries confined almost exclusively to Scotland. It was early patronised by royalty, the first monarch known to have played being James IV (1473-1514). Charles I and James II of England were ardent golfers. The St Andrews Golf Club, headquarters of the game, was granted the title "Royal and Ancient" by William IV in 1834. Outside Scotland golf was little known before the last decade of the 19th cent. The Royal N Devon Golf Club at Westward Ho! was formed in 1864, but it was only in the '90's that the game quite suddenly attained its widespread popularity.

A golf course normally consists of 18 "holes," *fairways* varying in length from c 100 to 500 yds. The actual hole, $4\frac{1}{2}$ in in diameter, is situated near the centre of a smooth "green," and usually marked with a flag. The play of each hole starts from a "teeing-ground," or "tee." For the first stroke, or "tee-shot," the ball may be placed on a little mound of sand or on a wooden peg, also called a "tee." A strip of smooth grass (the "fairway") usually connects the "tee" with the "green," the untended ground on either side being known as the "rough." The "greens" are usually protected by various natural or artificial obstacles, or "hazards," including sand-pits, or "bunkers."

A game is decided either by the number of holes won and lost (*match-play*), or by the number of strokes taken over a round (*medal-play*). In match-play the match is ended when one player leads by a greater number of holes than there are left to play, e.g. if he is 5 holes "up," with 3 to play. The remaining holes are then known as the "bye." When a player leads by the same number of holes as there are holes left to play, he is "dormy." Players are "handicapped" according to their skill by being allowed a certain number of strokes in matches and competitions, a "scratch" player is one who receives no handicap.

Handicaps are usually based on



Types of Golf Clubs

"bogey," the number of strokes in which a scratch player should be able to do each hole of the course, e.g. if the "bogey" of a course is 75, a player who can normally complete the course in 90 strokes should have a handicap of 15. On many courses "bogey" has recently been superseded by "par," the score for the course which would result from a perfectly played round.

Golf balls were originally made of leather stuffed with feathers, later they were solid gutta-percha ("gutties"). The now universal rubber-cored ball was invented in 1898.

Clubs are of many different kinds. the *driver*, a wooden-headed club for

driving off the tee the *brassie* resembling a driver but with a metal sole and used for long shots from a good lie the *spoon* like a short brassie with the face more laid back *Irons* are used for shots of medium length the *maskie* with a short head much laid back for lofting the *niblick* a short heavy club with the head much laid back

and during the World War The greatest golfers in the early days of the

Open were Tom Morris senr Tom Morris jun and Willie Park each being 4 times champion between 1860 and 1875 The dominating figures in the period 1890-1914 were the professionals Harry Vardon (open champion 1896 1898 1899 1903 1911 and 1914) J H Taylor (open champion

GOLF



DRIVE



WITH

WOODEN



CLUB



IRON SHOT



PUTTING

for getting out of bunkers and the rough the *putt* r with an upright face of iron wood or aluminium for putting making the short strokes on the green which finally deposit the ball in the hole Club shafts are usually made of hickory but steel shafts have recently become popular

The first Open Championship was held at Prestwick in 1860 and has since taken place annually except in 1872

1894 1895 1900 1909 and 1913) and James Braid (open champion 1901 1903 1908 1903 and 1910) and the amateurs John Ball jun (open champion 1890 amateur champion 1888 1890 1892 1894 1898 and 1907) Horace Hutchinson (amateur champion 1886 and 1887) and H H Hilton (open champion 189 amateur champion 1900 and 1901) The Amateur Championship was first held in 188

FOUR PROMINENT ENGLISH GOLF PLAYERS



Diana Fishwick



Henry Cotton



Percy Alliss



Archie Compston

and the Ladies' Championships in 1893 Amateur and Open Championships are played at St Andrews Muirfield Prestwick Sandwich Hoylake or Deal

Golf has been extremely popular in the U.S.A. since c. 1800 and has made great strides since the War. The only American to win a British Championship before the War was W. J. Travis who was amateur champion in 1894 but since 1901 when the winner was Jock Hutchison a Scotsman naturalised in the U.S.A. American players have carried off the Open in every year except 1923 when it was won by A. G. Havers. Walter Hagen was champion in 1900, 1904, 1908 and 1910. J. Barnes in 1909. R. T. (Bobby) Jones in 1906, 1927 and 1930. T. D. Armour in 1931. E. Sarazen in 1933 and J. Goodman in 1933. In 1930 Jones achieved the unique distinction of winning both the British and American Open and Amateur Championships. The only Englishman to win the American Open since the War was E. Ray in 1900. The Amateur champion in 1931 was E. Martin Smith in 1931. J. de Forrest in 1933. The Hon. Michael Scott-Muss End Wilson was Lady Champion in 1931, 1932 and 1933. The Walker Cup is competed for annually by teams of British and American golfers and the Ryder Cup by professional teams. Down to 1933 both cups were held by the U.S.A.

Gollancz, Sir Israel (1863-1930) English scholar and authority on Anglo-Saxon. Was Professor of English Literature at Cambridge and London. His publications include *Cynewulf's Christ* (1891), the *Exeter Book* (1895), the *Temple Shakespeare* (1894-6) and *Lamb's Specimens* (1893). He was Director of the Early English Text Society and Secretary of the British Academy, knighted in 1919.

Goltz, Baron Kolmar von der (1843-1918) German soldier and writer on military subjects. He became military Governor of Belgium in 1914 after German occupation and in 1915 com-

mander of the first Turkish army in Mesopotamia. He invested Townshead at Kut-el-Amara.

Gompers, Samuel (1850-1924) American Jewish Labour leader. Born in London, he emigrated to New York at the age of 13. In 1889 he was President of the American Federation of Labour. Defeated in a contest for this office in 1894, he was re-elected in 1895 and every subsequent year until his death. He became Editor of *The American Federationist* in 1894. During the World War he used his influence with the trade unions to repress pacifism. He was a member of the advisory commission of the United States Council of National Defence in 1917 and at the 1918-19 Peace Conference in Paris represented the American Federation of Labour. He was chiefly responsible for that organisation remaining outside the International Federation of Trade Unions in 1919. He was strongly opposed to socialism in the Unions and also to compulsory arbitration in disputes.

Goncharov, Ivan (1812-1891) Russian novelist held several Governmental positions. He is most famous for his novel *Oblomov* (1857) an account of upper-class provincial life.

Goncourt, Edmond de (1822-1896) and Jules de (1830-1870) French novelists and critics, brothers and collaborators who wrote of the 18th cent. in France and Japan. They analysed to finest detail every event and thought in their books. Their best novel is *Madame Gervais* (1869). Others are *Ronde Vauperrin* (1864) and *Manette Salomon* (1865). Fruits of their research are *Portraits intimes du XVIII^e siècle* (1858-8) and *L'Art du XVIII^e siècle* (1859-70).

Gondola, a boat used on the canals and lagoons of Venice, long and narrow with a flat bottom and curved up prow and stern. The rowers called gondoliers stand on the deck to use their sweeps. So much money was formerly spent on the elaborate decoration of these boats that legislation in the 16th cent. restrained the extra-

spores, and, later in the season, bearing yellow fruit bodies, just visible to the naked eye, which ultimately blacken. These contain the resting spores, which fall to the ground, and remain dormant through the winter, and then are blown on to new leaves the following spring. The disease does not as a rule assume serious proportions, and is controlled by spraying with lime-sulphur solution, early in May, with later applications if necessary. The ground under diseased bushes should be dug over in winter, and the resting spores buried, and fallen leaves should be collected and burnt, wherever practicable.

Standard commercial varieties are the large red *Crown Bob*, for picking green, with a thin hairy skin, *Careless*, grown chiefly for jam or picking green, large, creamy white, smooth skin, growth rather slender and spreading, *Cousen's Seedling*, a small, pendulous bush bearing dessert fruit of medium size, yellow and hairy, *Howard's Lancer*, a very large greenish-white fruit on strong bush, *Lancashire Lad*, a large, hairy, dark-red fruit for dessert or picking green, *Whinham's Industry*, a heavy cropper which succeeds on most soils, and is a favourite market variety, for picking green or for jam or cheap dessert, *White Lion*, a very late, large, white, slightly hairy fruit for dessert, extensively grown in Middlesex.

Gooseberry Fool, a purée (qv) of fruit and custard, or whipped cream, or a mixture of both.

Recipe

1 lb gooseberries
5 oz sugar
 $\frac{1}{2}$ -1 gill water
 $\frac{1}{2}$ pint custard or cream or a mixture of both

Stew gooseberries with sugar and water. Rub through hair sieve. Add cold custard or stir in slightly whipped cream.

Goosefoot (*Chenopodium album*), a common weed in Europe. The plant is edible and related to spinach. In

America it is known under the name "lamb's quarters."

Goossens, Eugene (b 1893), British musician, is one of the best-known modern composers and conductors of modern music. Studied at the Liverpool College of Music. Played in the Queen's Hall Orchestra 1911-15, composing during that time various works whose first performance he conducted. Conducted principal orchestras throughout the country 1915-20, introducing many new works by modern composers. Conducted Rochester Symphony Orchestra concerts in U.S.A., 1923-4, and on his return to London conducted seasons of Russian ballet. His most striking and significant work is his chamber music, but he has composed orchestral pieces and songs.

Gophers, name used in America for two distinct species of rodents, one represented by several different kinds of marmot-like ground squirrels, related to the European susliks (qv), the other by the pocket gophers, which are more akin to the rats, and are mainly subterranean in habit, having short legs, minute eyes and ears, and very large food-pouches on the cheeks outside the mouth.

Goral, an antelope, the size of a small goat, related to the chamois, but with slightly curved horns, which is found in the Himalayas and the mountains of Burma, China, and Japan.

Gorboduc, or *The Tragedy of Ferrex and Porrex*, the title of the earliest English tragedy, played before Queen Elizabeth in 1562, published in 1570, by Thomas Sackville and Thomas Norton. Gorboduc was a legendary King of Britain, who gave away his kingdom to his sons, Ferrex and Porrex. These quarrelled, and one killed the other, whereupon their mother killed the survivor, the King killed the mother, and the people rose in anger and put both King and Queen to death.

Gorchakov, old Russian family whose many distinguished members include Peter Dimitrievich (1818-1868), who subdued a revolt in

caucasus in 1820 and took part both in the fighting against the Turks in 1808-9 and in the Crimean War. PRINCE MIKHAIL DIMITRIEVICH (1795-1861) who fought against the French in 1812-15 and was Commander in Chief in the war with Turkey (1853) and at the Crimea when he was in charge of the defence of Sebastopol and Prince ALEXANDER MIKHAILOVITCH (1798-1883) a famous Russian statesman and one of the most notable of European diplomats. He was Minister at Vienna during the Crimean War later becoming Minister of Foreign Affairs and Chancellor.

Gordian Knot, The, a knot which could be untied by only one man. Gordius king of Phrygia consecrated his chariot to Jupiter as a thank offering and it became a belief that the knot which bound the yoke of the cart to the shaft could be untied only by the man who would conquer Asia. When Alexander the Great arrived at Gordium he attempted to undo the knot, and failing to do so with his fingers cut it with his sword. Thus to cut the Gordian Knot to-day describes a bold decisive action effective where milder measures fail.

Gordon, Adam Lindsay (1833-1870) Australian poet. His verse published in *Sea Spray and Smoke Drift* (1867), *Ashtaroth* (1887) and *Bush Ballads and Galloping Rhymes* (1870) captures the atmosphere out back where he led an adventurous life. He committed suicide.

Gordon, General Charles George (1833-1885) famous British soldier born at Woolwich. His brilliant work in quelling the Taiping revolt (1860-4) caught the imagination of his countrymen and as *Chinese Gordon* he became a national hero. He was appointed Governor of the Sudan in 1873 a post which he held till 1880 when he resigned. Four years later he returned to the Sudan where the Mahdist revolt necessitated the evacuation of the Egyptian population an undertaking which he was chosen to carry out. In Feb 1884 he arrived at Khartoum where he was surrounded by the

Mahdists forces and besieged from March till Jan of the following year holding the town with the help of only 1 British officer. The Government at home chose to wait 5 months before a relief force was sent to Gordon's aid and it was not until Jan. 28 that the advance body arrived at Khartoum to find that the place had fallen and that Gordon had been killed 9 days before.

Gordon, Lord George (1751-1793) English politician a son of the 3rd Duke of Gordon born in London joined the Navy as midshipman and served with the British fleet in American waters being promoted to lieutenant at which rank he resigned. He won a seat in Parliament where he attacked both sides freely. In 1779 he became President of the Protestant Association. A recent Bill had given Roman Catholics relief from certain disabilities. In 1780 the Association passed a resolution of protest and thousands of people led by Gordon marched on the Houses of Parliament and filled the lobbies while Gordon presented the petition. It was read but adjourned. The mob grew noisy and menacing and despite Gordon's efforts could not be dispersed until troops arrived when they moved off peacefully. When the petition was to be reconsidered an excited multitude gathered before the House howling No popery and in spite of the efforts of their leader became out of hand but Newgate and opened the other prisons. The mob did damage estimated at £180,000. The troops were called out and 210 rioters killed. Gordon was arrested and after 8 months in the Tower was tried on a charge of high treason but was acquitted. Later he supported the Dutch against the Emperor Joseph and nearly caused a mutiny in the British Navy. Gordon then was received into the Jewish faith. He was involved in a libel suit against Marie Antoinette and in 1788 was sentenced to five years imprisonment at Newgate.

where he lived comfortably, conforming to the ritual of the Jewish faith. He died of jail fever.

Gordon Bennett Cup: (1) A trophy instituted by James Gordon Bennett in 1899 for the encouragement of motor-racing. Contests have been held in various countries, including America and the Isle of Man. The cup was won by an Englishman, S F Edge, in 1902, over the Paris-Innsbruck course.

(2) Cup for an international air race, the first contest for which took place in 1909 at Rheims. It was first won for Britain in 1910 by Grahame-White in America. The race was discontinued during the World War, but resumed in 1920.

Gordon Riots, *see* GORDON, LORD GEORGE

Gore, Charles (1853-1932), English bishop and theologian. He became Vice-Principal of Cuddesdon Theological College, 1880-93, and Canon of Westminster, 1894. In 1892 he founded the Community of the Resurrection at Mirfield. He was successively Bishop of Worcester (1902), Birmingham (1905), and Oxford (1911), resigning in 1919. Bishop Gore was a pioneer of the Modernist movement, attempting to reconcile science and religion and to find a place in religion for reason as well as faith. At first sympathetic with the Tractarians, he produced in 1890 a series of essays by various writers entitled *Lux Mundi*, which marked a break with the tradition of the Oxford Movement. It was as Bishop of Birmingham that Gore was most prominent. He was an advocate of international peace. He did more than any other modern ecclesiastic to bring home to the Church its social responsibilities.

Gorgas, Wm Crawford (1854-1920), American army surgeon, who discovered that yellow fever is carried by mosquitoes. In 1904 he went as chief sanitary officer to Panama, where he eliminated yellow fever and brought malaria under control. The Gorgas Memorial Institute of Tropical and Preventive Medicine and a Memorial

Library at Panama were established at Washington in his honour.

Gorgons, in classical mythology, three sisters, Stheno, Euryale, and Medusa, the last-named alone being mortal. Each hair was a serpent, their bodies were scaly, their hands of brass, their teeth like tusks, and their glance would turn a mortal to stone. Perseus (*qv*) was sent to kill Medusa and bring back her head, which he did by watching her reflection in a mirror and so avoiding the deadly glance. He gave the head to Minerva, who wore it on her shield, turning to stone whomsoever she wished to destroy.

Gorgonzola, *see* CHELSE

Gorilla, the largest and least arboreal of the Anthropoid Apes (*qv*), found in the forests of tropical Africa, where it roams about in family parties, feeding upon foliage and fruits of various kinds. A full-grown male is a huge, unwieldy powerful beast with a ferocious aspect, standing, when erect, 5½ ft or more in height, but in spite of reports to the contrary, he is comparatively unoffensive, and only attacks man in self-defence. The female is much smaller, and usually takes refuge with the young in trees at night, making a platform of branches to sleep upon while the male mounts guard at the bottom.

The colour of the gorilla is black or brown, varied more or less with grey, which increases in amount with age. The common gorilla is found in the lowland forests of W Africa, and another kind, known as the mountain gorilla, inhabits the Kivu Range on the borders of Uganda to the E.

Gorizia (Ger *Görz*), a town and winter resort on the Isonzo, 12 m N of the Gulf of Trieste, N Italy. There is a small silk industry. The town has a 14th-cent cathedral, an interesting museum, and an attractive public garden. Gorizia was the scene of many important battles on the Austro-Italian front in the World War. Pop (1931) 49,240.

Gorky, Maxim, pseudonym of Alexei Maximovich Peshkov (*b* 1868)

Russian author. He worked at many trades before becoming a journalist. In 1897 a collection of his stories was published and brought him immediate fame. In 1903

his play *The Lower Depths* was acted and established his reputation. He was a Socialist, a friend of Lenin and supported the revolution of 1917.

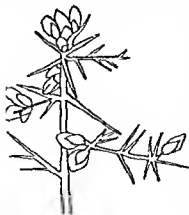
His works probably based largely on his own struggles.



Maxim Gorky

are very popular among Russian workers and deal mostly with men of the oppressed classes who rise through strong personality.

Gorse, a common and well known shrubby wild plant found on sandy soils with sweet-scented golden flowers produced almost throughout the year.



Gorse.

and leaves reduced to tiny scales while the stems are green and modified to thorns. The profusion of gorse on English hills excited the envy and

admiration of Linnaeus the great Swedish botanist of the 18th cent who knew it only from rare and treasured specimens in hothouses. The length of the flowering season is best described by the phrase in S. England: Kissing's out of fashion when the gorse is out of bloom.

Goschen, George Joachim Goschen, Viscount (1831-1907). British statesman, a Director of the Bank of England (1858). Liberal M.P. for City of London (1867-80). Vice President of Board of Trade and Paymaster-General (1860). Chancellor of Duchy of Lancaster and member of Cabinet (1866) and First Lord of the Admiralty (1871-4). He opposed Gladstone on the Home Rule question and becoming a Unionist succeeded Randolph Churchill as Chancellor of the Exchequer (1886-9) and negotiated the conversion of the National Debt in 1888. He was First Lord of the Admiralty from 1890 till his retirement in 1900 when he was created a peer. He wrote on finance and education.

Goshawk, a large hawk, now very rare in England, closely related to the sparrowhawk which it resembles in its long legs tail and short wings. It was formerly used in falconry more particularly for the capture of hares.

Gospels, the four extant accounts of the life and death of Christ in the New Testament traditionally ascribed to Matthew Mark Luke and John. The first three which largely share a common standpoint are known as the Synoptic Gospels. The ascription of the fourth Gospel to John the Apostle is no longer accepted by most critics.

Goss, Sir John (1800-1880). English composer of Church music, organist of St Paul's Cathedral 1838-7. He composed anthems, theoretical works and a *Church Psalter and Hymn Book*. He was knighted in 1872.

Gosse, Sir Edmund (1849-1928). English poet and essayist was assistant librarian at the British Museum (1867-75), translator to the Board of Trade and librarian to the House of Lords (1904-14). His works marked

by a charming and graceful style, include *Collected Poems* (1896), many valuable studies of 17th- and 18th-century writers, *French Profiles* (1905), the autobiographical *Father and Son* (1907), his best-known book, and biographical and critical studies of Browning, Coventry Patmore, Swinburne, Ibsen, and other authors. He was honoured by many countries and universities, and knighted in 1925.

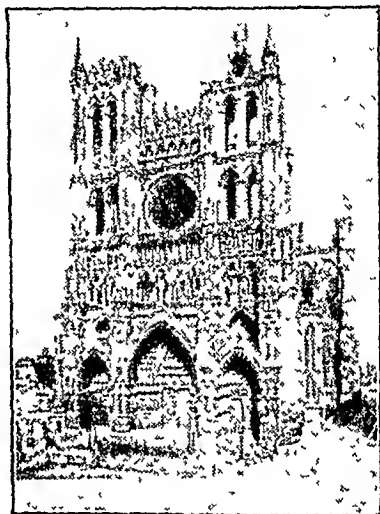
Gotha, *Almanach de*, a universal political register named after its place of publication. It is a reliable governmental, diplomatic, and statistical record of the world, giving information as to population, trade, etc., of the countries and States, and containing a section on the genealogy of royal families and the outstanding nobility. It has been published in German since 1764, and in French also since 1871.

Gotha, Duchy of, see SAXE-COBURG-GOTHA.

Gotham, *Tales of the Mad Men of*, a collection of sayings and accounts of the doings of the inhabitants of Gotham, a village in Nottinghamshire. The simplicity of the inhabitants has become proverbial, but, according to legend, was feigned to discourage King John from living in the neighbourhood. A typical example is the story of the people joining hands to form a ring round a thornbush to imprison a cuckoo in order that, by singing all the year round, it might give them perpetual spring. The tales originally appeared c. 1550, being entitled *Merrie Tales of the Mad Men of Gotham*.

Gothenburg (*Göteborg*), city and chief seaport of Sweden, at the mouth of the Göta. Shipbuilding is important, and there are also breweries and distilleries, saw-yards and flour-mills, and tobacco factories. There are a university and an important city library. The town achieved world fame by reason of the Gothenburg System, a plan for the control of the liquor traffic introduced in 1865. Pop. (1932) 247,911. Gothenburg is connected by the Göta river and canal with the Baltic.

Gothic Architecture, W. European architecture of the later Middle Ages, developed out of Romanesque and eventually superseded by Renaissance architecture. It flourished from the middle of the 12th to the middle of the 16th century. In England it is divided into Early English (c. 1190-1315), Decorated (c. 1315-80), and Perpendicular (c. 1380-1550). The early or Primary



Amiens Cathedral, a fine example of Gothic architecture

French Gothic (12-13th cents) developed into Rayonnant (14th cent) and Flamboyant (15-16th cent). The main features of Gothic architecture are the general adoption of the pointed arch, with the consequent development of the ribbed vault, the introduction and elaboration of window tracery, the decorative treatment of structural elements such as buttresses and flying buttresses, vaulting members, piers, and gables, and a general emphasis on height, which reached its greatest expression in Beauvais Cathedral.

At the end of the Gothic period Renaissance motifs were introduced, especially in domestic architecture,

into the later until its distinctive features disappeared altogether. In the 19th cent. the lifeless Gothic revival although in itself regarded as a failure led to the disappearance of the stucco-covered Georgian style and the development of the domestic architecture which has lasted up to the present. For further details see ARCHITECTURE, and separate articles on the various styles.

Gothic Language, an extinct language representing and comprising the E group of the Germanic languages (qv). In it is preserved the oldest monument of the Germanic tongues: a translation of part of the Bible ascribed to Bishop Wulfila or Ulfilas (d. 383). The language which in the 6th cent. was widely spoken all over Europe and N. Africa vanished with extraordinary rapidity.

Gothic Novel, a class of novel which became popular at the beginning of the romantic revival in England. It dealt with Gothic castles, ghosts, murders, weird and mysterious occurrences etc. Notable examples are Horace Walpole's (qv) *Castle of Otranto* and many of the novels of Ann Radcliffe (qv).

Goths, the name of a people of Germanic race who invaded the Roman Empire during the period of barbaric invasions. They appear to have come originally from the S coast of the Baltic Sea. By the 3rd cent. A.D. they had founded a kingdom between the Danube and the N coast of the Black Sea, and on the Danube were threatening the integrity of the Roman Empire. During this period they defeated the Romans more than once and sacked Athens. The Emperor Aurelian ceded Dacia to them. The people split into two sections: the Visigoths (qv) in Dacia and the Ostrogoths (qv) on the shores of the Black Sea.

Götterdämmerung [GUTEDÄM MÜROŋG] literally the Twilight of the Gods, is the name given in Teutonic mythology to the last days of the gods.

and utterly destroyed. It is also the title of an opera by Wagner (1876) the last of the series of *The Ring of the Niebelungs*.

Göttingen, town in State of Hanover, Germany, famous for its University founded by George II of England (1737). Its library consisting of 600 000 volumes and rich in modern works is housed in an old monastery. Its industries are few and include cloth manufacture, scientific instruments and book publishing. The names of the Grimm brothers and Bismarck are linked with the town. Pop. 45 800.

Gough, Sir Hubert de la Poer (b. 1840) British general joined the 16th Lancers in 1889 and served in the Turah expedition 1897-8 and the African War 1899-1900, obtaining several decorations and being promoted to Brevet Lieut.-Colonel. He became Commanding Officer of the 16th Lancers in 1907 but gave up his commission (1914) rather than proceed against Ulster. He went to France at the outbreak of the World War and later assumed command of the Fifth Army. He was knighted in 1916 and promoted Lieut. General in 1917 but was recalled after the German offensive in March 1918. He was made K.C.V.O. in 1917 and G.C.M.G. in 1919 in which year he was sent to the Baltic States to co-ordinate the Allied attack on Russia. In 1931 he published *The Fifth Army*, an account of his war time experiences in France.

Gould, Sir Francis Carruthers (1844-1935) is best known for his cartoons in the *Westminster Gazette*. After some 25 years as a member of the Stock Exchange where his caricatures of his fellow members had a wide circulation he became assistant-editor to the *Westminster Gazette* and also contributed drawings to *Truth* and the *Pall Mall Gazette*. He published *Tales told in the Zoo* (1900), *Who killed Cock Robin?* (1897) and *Froussart's Modern Chronicles* (1902-3).

Gould, Gerald (b. 1884) English

critic, poet, and novelist. His works include *Poems* (1911), *Lady Adela* (1920), *The English Novel of To-day* (1924), *Collected Poems* (1929), *All about Women* (1931), *Essays and Parodies* and *Isabel* (1932).

Gould, Jay (1836-1892), American financier. Son of a farmer, at the age of 16 he entered an ironmongery store, where he remained 4 years, studying surveying in his spare time. He bought a controlling interest in the Rutland and Washington Railway in 1857, and in 1859 started a broker's business in New York. He had become President of the Erie railroad in 1856, and the Union Pacific, Missouri Pacific, Texas Pacific, Wabash, and other railways came under his control. In 1881 he formed the Western Union Telegraph System.

Gould, Nat (1857-1919), English novelist, author of a prodigious number of popular stories, most of which deal with horse-racing.

Gounod [gōō'nō], **Charles** (1818-1893), composer of *Faust*, one of the world's most popular operas. Born in Paris, he studied at the Paris Conservatoire, and won the Prix de Rome, 1839. His works before *Faust* consisted mainly of Church music, and two operas, *Sapho* (1851) and *Le Médecin malgré lui* (1858). *Faust*, produced at the Théâtre Lyrique in 1859, was his first and most lasting success. *Mariette* was produced in 1864, and *Romeo et Juliette*, the opera which ranks next in popularity to *Faust* among Gounod's works, in 1867.

Gounod came to London at the time of the Franco-Prussian War, and in 1870 founded what is now known as the Royal Choral Society. His best-known oratorios were both composed for the Birmingham Festival—*The Redemption* being performed there in 1882 and *Mors et Vita* in 1885. Besides these he produced many popular hymns and songs. Gounod's religious works have not retained the popularity they enjoyed in Victorian times, but *Faust* is still performed in every opera-house.

Gourd, the name given to different plants of the family Cucurbitaceæ, to which belong the marrow, cucumber, melon, etc. The shell of the fruit is used as a vessel, also named the gourd. The various shapes of the different species permit the making of bowls, bottles, floats, etc. The calabash from which tobacco pipes are made is a gourd.

Gourmont, Rémy de (1858-1915), French author, founder of the *Mercur de France* (1890), novelist, essayist, and critic. His novels include *Sixtine* (1890) and *Une Nuit au Luxembourg* (1908). His best-known critical works are *L'Esthétique de la langue française* (1899) and *Le Problème du Style* (1907).

Gout, a constitutional disease which gives rise to excess of uric acid in the blood and a deposition of salts of uric acid in and around the joints. Excessive eating and drinking and certain poisons, notably lead, predispose to the condition. The disease attacks the joints very suddenly. There may be warnings in the form of dyspepsia or heart-burn, but the joint itself, commonly the big-toe joint, becomes suddenly painful in the middle of the night, very swollen, the skin hot, red, and shiny. After some days, possibly 2 weeks, the swelling subsides, and the patient will be in good health until the next spasm. The joints affected never suppurate, but if the disease is long standing, it tends to become chronic and the joints undergo permanent changes. Gouty stones may form under the skin, and from time to time can actually be picked out, giving great relief.

Government. In a general sense, any orderly management of human affairs, especially in organised society. The term is most commonly used to denote the political organisation of the State, the mode by which the State expresses itself. Thus the State may change its political organisation without losing its political identity, a fact most clearly demonstrated in post-War Europe. Government is based upon force, and this force, though used

LAND'S END



KING HENRY VIII

mainly to constrain the subject, of the State is in the last analysis derived from the body of the subjects themselves (see SOVEREIGNTY). The object of government is the preservation of justice and good order. It is to ensure domestic tranquility, provide for the common defence and promote the general welfare. Its efforts in that behalf are ceaseless so that at the present time there is probably not one form of human activity which is not more or less controlled by the State whose activities range from the defence of the realm, the maintenance of peace and the administration of justice to matters such as the maintenance of highways and postal and telegraph systems, sanitary regulations, the coinage of money, the regulation of trade, the preservation of good morals etc.

With regard to its form, government may be either autocratic i.e. in the hands of a minority of the State who exercise their power arbitrarily or it may be popular i.e. one in which the substantial power is vested in the entire body of persons constituting the State. The latter form is comparatively modern in England which affords the best example: it began to develop fairly early but did not become really established until the reign of William and Mary. On the Continent autocracy was the general form of government a state of affairs which lasted until the fall of Napoleon and the rise of the spirit of nationalism which followed it. In post War Europe however popular government is becoming more and more discredited. Italy, Germany, Poland, Rumania have all adopted a more or less complete dictatorship.

The structure of the government of a country is generally extremely complex though less so under an autocracy than in a democratic State. In England for instance the government is carried on by the Cabinet in the name of the Crown but the Cabinet must have the support of Parliament. In addition, there is a considerable organisation of local

government (qv) in the counties, towns, parishes etc. which are thus largely independent of the central government. This is a type that has been adopted by most countries throughout the world but again we may note the present-day process of simplification that is involved in the return to autocracy.

Again matters may be complicated by the union of several States. So, a union may be a personal union resulting from the accidental union of two crowns in the same monarch which leaves the two States mutually independent e.g. Great Britain and Hanover 1714-1837. It may be a real union wherein two sovereign States are linked together for ever by international treaty e.g. Sweden and Norway until 1905. In these two forms the effect on the internal administration is negligible in the case of Confederated States (qt) and Federal States (qt) however it is considerable since the powers are divided between the central government and the constituent States.

For the different types of government existing in the British Empire see BRITISH EMPIRE. See also PROTECTORATE, MANDATE, SPHERE OF INFLUENCE.

Governor one who exercises authority e.g. the governor of a colony or of the Bank of England etc. In the British Empire the Governor is the personal representative of the Crown by which he is appointed. In crown colonies the Governor exercises both legislative and executive functions. In self governing dominions he acts on the advice of responsible ministers. Governors are classified as Governors General, Governors and Lieutenant Governors and which of these will be appointed depends on the importance of the dependency. They are responsible to the Colonial or Dominions Office.

Gower John (1337-1408) the last Anglo-Norman poet a friend of Chaucer whose *Troilus and Criseyde* was dedicated to the moral Gower. His

three great works were *Speculum Mediantis* (French), *Vox Clamantis* (Latin), *Confessio Amantis* (English). This last, a collection of classical stories, was greatly popular when printed by Caxton (1483), and influenced 15th- and 16th-cent writers.

Gower, peninsula, Glamorganshire, Wales, almost surrounded by the Bristol Channel, it contains Swansea and Oystermouth.

Gowrie Conspiracy, a mysterious incident in Scottish history, Aug. 1600. According to his own account, James VI of Scotland (later James I of England) was asked, while hunting in the neighbourhood, to visit Gowrie House, Perth, the seat of John Ruthven, Earl of Gowrie, to examine a prisoner who had a quantity of foreign gold. On arrival he was taken by the Earl's brother, Alexander Ruthven, to a turret where he found an armed servant of Gowrie. Ruthven seized a dagger the servant was wearing, and threatened to stab the king if he gave the alarm. He left James in the charge of the servant and, after consulting his brother, returned to dispatch the King, but the struggle which ensued was observed by some of the King's followers from the garden below. They forced an entrance to the turret and killed both the Ruthvens. Three explanations have been suggested of the occurrence—one, that there was no plot, but merely a personal quarrel on the particular night, secondly, that the Ruthvens, possibly as tools of Queen Elizabeth, planned to murder James, thirdly, that James visited Gowrie House intending to kill the Ruthvens. The last-mentioned theory is supported by the animosity James showed to the two innocent younger brothers of the Ruthvens.

Goya y Lucientes, Francisco (1746-1828), Spanish painter and etcher, was born at Fuentetodos, in the province of Aragon, and studied for a time at Saragossa. He proceeded to Madrid at the age of 19, but was soon travelling with a troupe of bull-fighters, ultimately finding his way to

Italy, where he apparently settled down to study his art once more. In 1771 he returned to Saragossa, where he remained for 4 years painting frescoes in the cathedral and elsewhere. He then went again to Madrid, where the cartoons he designed for tapestries soon won him great admiration. In 1786 he was established as a Court painter, producing his astonishingly truthful and revealing series of royal portraits. His work during this period



Study in Wash, by Goya

includes his fine portrait of the Duchess of Alva, who seems to have been his close friend and protector. In his old age he went to Bordeaux, and there died at the age of 82.

Goya's painting is remarkable for its great beauty of texture and handling. His portraits are wonderful records of the personal character of the notabilities of his time. He had considerable influence on later painters, notably on Manet and Whistler. For his paintings alone he must be ranked high in the list of Spanish artists, but he is even more renowned for his

wonderful series of etchings and satirical drawings. His bull fights are masterly in their arrangement and show his skill as a draughtsman. His series illustrating the horrors of war express an intensity of feeling and his satirical plates *The Caprices* criticising the manners and customs of the day have probably been equalled only by those of Daumier. There are four Goya paintings in the National Gallery.

Gozo an island belonging to England in the Mediterranean 3 m NW of Malta and forming part of the Maltese Islands. Wheat and cotton are grown and lace known as Maltese lace is manufactured. Area, 26 sq m pop c 23 000.

Gracchus Roman plebeian family of the gens Sempronia. Its most famous members were the two tribunes sons of **TIBERIUS SEMPRONIUS GRACCHUS** (c 210-181 B.C.) praetor in *Hispania Citerior* in 181 and censor in 169. **TIBERIUS SEMPRONIUS GRACCHUS** (163-133 B.C.) served in the 3rd Punic War under the younger Scipio and was appointed quaestor in Spain in 137 and tribune in 133. His agrarian law aimed at helping the poorer farmers was passed in the teeth of violent opposition. His re-election as tribune for an additional consecutive year was declared illegal by the Senate and during a riot which arose at the voting Tiberius was killed. **GAIUS SEMPRONIUS GRACCHUS** (153-121 B.C.) was one of the commissioners appointed to carry out the provisions of his brother's agrarian law. In 131 he supported a bill to legalise the holding of the tribunate for two consecutive years and he was himself elected tribune in 123 and 122. As tribune he revived his brother's agrarian law, founded the Roman colony of Iunonia on the site of Carthage and strengthened the position of the equites. He was killed after a riot caused by an official proposal to abandon Iunonia. The Gracchi were brought up by their mother **CORNELIA** whose training of her sons has become proverbial.

a term in theology hardly

capable of exact definition but meaning generally the relation of friendship with God which results from freedom from sin and response to God's appeals to the soul. Grace is conferred both directly and indirectly through the sacraments in the belief of the Roman Catholic Church the sacraments convey grace by their reception though this may be rendered nugatory by the evil disposition of the recipient in the general belief of Protestants the faith and co-operation of the recipient are essential.

Grace William Gilbert (1843-1915) English cricketer and physician played in first-class cricket (for Gloucestershire England etc) from 1865 to 1908 scoring 54 806 runs and taking 2876 wickets. In first-class matches he scored 126 centuries (a record which stood till 1925) and in all cricket 217 centuries. His highest score in first-class cricket was 344 for MCC v Kent in 1878. In 1890 he scored over 1000 runs in May. He visited Australia in 1873-4 and 1891-2. His brothers E. M. GRACE (1841-1915) and G. F. GRACE (1850-1880) were also distinguished cricketers.

Graces The Three in Greek mythology were three sisters Euphrosyne, Aglaia and Thalia closely connected with the Muses and with Venus. They presided with them over dancing, singing and kindred occupations.

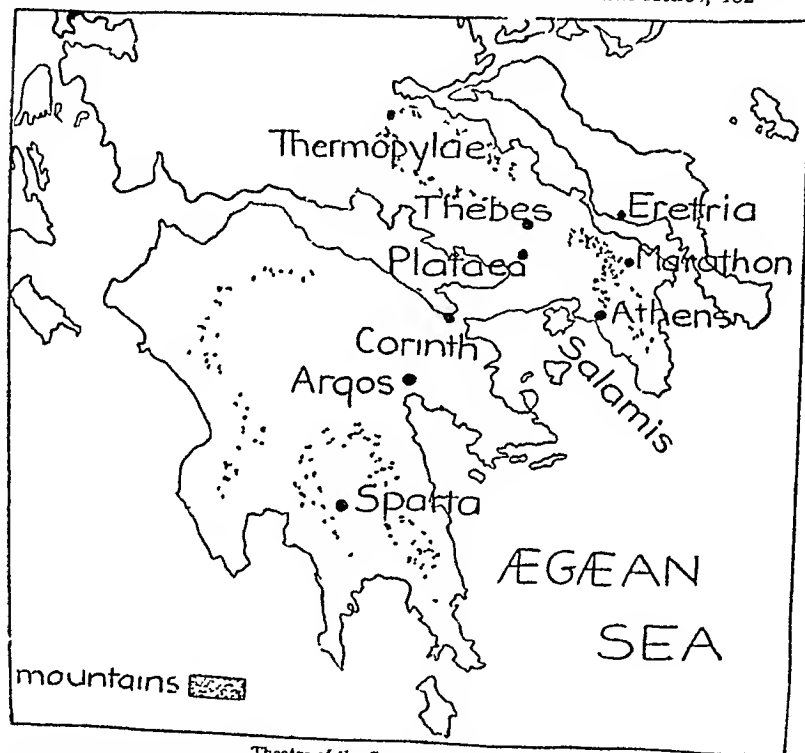
Grackle name for two distinct families of birds related to the starlings applied in India to those more commonly known as mynahs (*q.v.*) and in America to certain species better known as troupials (*q.v.*)

Graduate one who has gone through a certain course of study at a university passed the necessary examination and received the appropriate degree.

Graeco-Persian Wars, a series of wars fought 546-466 B.C. between the Persian Empire and the States of Greece. Greek colonies on the coast of Asia Minor at the beginning of the 6th cent. B.C. became subject to the kingdom of Lydia. With the conquest of Lydia in 546 B.C. by Cyrus King of

Persia, the Greek cities of the mainland came under Persian rule, and the Græco-Persian conflict began. There were three main stages: the revolt of the Ionian cities, the expeditions of Darius into Europe, and the expedition of Xerxes. Previous to the Ionian revolt a Persian expedition had been

draw from Miletus. At Cyprus the rebels were subdued. After some years' fighting the Persians crushed the revolt by the battles of Lade (496) and Miletus (495). In 493 Darius's expedition to Macedonia and Thrace quelled the last insurgents. His fleet was destroyed in a storm off Mount Athos, 482.



Theatre of the Græco-Persian Wars

made against the Scythians by way of Thrace, and the democrats at Athens had allied themselves with Persia at the cost of independence. In 499 B.C. the Ionian cities under Persia revolted, Cyprus and Caria joined in, and Athens and Eretria sent assistance to the rebels, who at first were successful. They won Byzantium and Propontis, and compelled Artaphernes to with-

In 492 a Persian expedition sailed across the Aegean Sea to Euboea, captured Eretria, sailed for Athens, and landed at Marathon. The Athenian army marched to meet them, purposely leaving Athens exposed. The Persians embarked for Athens, rather than risk fighting their way through the narrow passes. Their covering force was decisively defeated at Marathon (490) by

the Athenians who marched back to Athens before the Persian fleet and army arrived. The Persians sailed for Asia without attempting to land.

In 481 Darius's successor Xerxes began a further invasion of Greece. He crossed the Hellespont by a bridge of boats. The Greek States could not agree on the method of defence. The Athenians would not leave their territory to concentrate defence at the Isthmus of Corinth. The Persians followed the only available route between Thessaly and the Isthmus. Seven thousand Greeks unsupported by the large forces available in the Peloponnese defended the pass at Thermopylae (480) but were defeated. The Persian fleet was defeated by the Greeks at Salamis. The position of the latter confined to a narrow strait was precarious but they enticed the Persians to attack them in the strait and won a decisive victory. The Persians withdrew to Thessaly. In the next year but were defeated at Plataea and at Mycale (479). See also GREEK HISTORY.

Greco-Turkish Wars (1) 1897 between Greece and Turkey. The Greeks had been supporting Cretan insurrections against Turkey and Greeks and Cretans wished to be united. The Greeks provoked Turkey into declaring war by expeditions of irregular forces into Thessaly. Two campaigns were fought. In Thessaly the Greeks were decisively beaten. In Epirus they were repulsed after initial success. At sea the Greeks were victorious. The Turks obtained an indemnity and territory in Thessaly in the resulting peace settlement.

(2) 1921 the Greeks declared war on Turkey over the non fulfilment of the Sèvres Treaty in spite of the Allied suggestion that certain revisions of that treaty might be desirable. The Greek forces were decisively beaten on the R. Sakaria and were driven from Asia Minor. Smyrna was sacked and burnt. Greece had to put up with the even more drastic revisions settled by the Treaty of Lausanne (1923). One

result was the compulsory interchange of Greek nationals in Turkey and Turkish nationals in Greece.

Grafting the insertion of a young shoot or scion into the stem or stock of another plant to unite one with another as one plant. The scion makes starch foods and the stock's roots supply water and mineral salts but each retains its own individual structure except in rare cases. Grafting conveniently propagates many woody dicotyledons and is often successful with herbaceous plants but fails with monocotyledons. Grafts are successful only when stock and scion are of the same natural family usually different species of the same genus such as peach on plum pear on quince apple on pear or tomato on potato. Grafts from one genus to another are less usual but the medlar is grafted to the hawthorn and the Spanish chestnut on the oak. The scion is often somewhat modified by the stock in such qualities as the size and flavour of the fruit and the period of ripening while grafted fruit trees bear more and better fruit as a general rule than do those on their own roots. The method of grafts and the best period varies with each species. See also BUDDING.

Grafton, Augustus Henry Fitzroy 3rd Duke of (1733-1811) English politician. He was Secretary of State in Rockingham's ministry (1765). A year later Pitt on becoming Earl of Chatham chose him as first Lord of the Treasury and later nominal Prime Minister until 1767. His opposition to the aggressive policy of the Government towards America led to his resignation in 1775 but in 1778 he was again a member of the Rockingham ministry.

Graf Zeppelin The name of a rigid passenger airship built at Friedrichshafen in Germany in 1908 and named after Count Zeppelin (1838-1917) the inventor of this type of vessel. She is 776 ft long has a capacity of 3½ million cu ft a lift of 1.9 tons and is propelled by 5 engines of 9650 horse-power each. Her most

famous voyage was that round the world in 1929, when she covered 19,500 m in 21½ days. She has also been engaged on a semi-regular service with passengers and mails across the S Atlantic, and has covered several hundred thousand miles without accident under her commander, Captain Eckener.

Graham, Stephen (b 1884), English writer. He was early attracted by Russian literature, and as a young man went to Russia to gain experience of the conditions there. He later visited America for the same purpose. He served as a private in the Scots Guards in the World War, and in 1919 wrote *Private in the Guards*, a novel attacking military discipline. He has also written several other works, based on his travels, including *A Vagabond in the Caucasus*, *Undiscovered Russia*, *With Poor Emigrants to America* (1914), *Russia in 1916* (1917), *Children of the Slaves* (1920), *Europe — Whither Bound?* (1921), *London Nights* (1925), *Gentle Art of Tramping* (1927), *The Tramp's Anthology* (ed., 1928), *A Modern Vanity Fair* (1931), *Stalin, An Impartial Study* (1931).

Grahame, Kenneth (1850–1932), author. As a writer for children he ranks almost with Lewis Carroll, he is famous for *The Golden Age*, *Dream Days*, and *Wind in the Willows*. He was Secretary to the Bank of England from 1898 to 1908, and produced his first published work, *The Headswoman*, in 1890. His books achieved great popularity, *The Golden Age* (1895) being highly praised by Swinburne.

Grahame White, Claude (b 1879), not only owned one of the first petrol-driven cars in England, but was the first Englishman to gain an aviator's certificate (1900). In 1910 he won the Gordon Bennett Cup with the record speed of 60½ miles per hour. He founded the first British Flying School and formed a Company to run the Hendon aerodrome. He has published many works on aircraft from both the historic and technical viewpoints.

Graien Alps, mountain range, part of the major Alpine chain, between Mont Cenis and the Little St Bernard Pass. They form part of the Franco-Italian frontier. The highest peaks are Pointe de Charbonnel (12,340 ft) and Aiguille de la Grand Sassière (12,323 ft).

Grail, The Holy, the mystical vessel, cup, or dish whose story permeates the Arthurian legend in the form most familiar to modern readers. It is almost certainly pre-Christian in origin, and is connected with some very ancient ritual. Later, through Christian influence, it became identified with the Cup used at the Last Supper, and brought to England, according to legend, by Joseph of Arimathea. In Malory's *Morte d'Arthur* it appears periodically borne through the feast-hall, and providing each knight with his favourite dish, but mainly it is the object of the famous Quest undertaken by most of Arthur's knights, fully achieved only by Galahad, and causing a general dispersion of the Knights.

Grain: (1) A word used for the fruits or seeds of any grasses, but generally restricted to those of economic value, such as wheat, barley, oats, maize, rye, rice, millet, etc. (2) In wood, the direction in which the fibres run and are smooth to the working of a plane, etc. It is in the direction of the growth of the tree, that is to say, lengthwise with the trunk, boughs, etc.

Grains of Paradise, see SPICES AND CONDIMENTS.

Grammar is the branch of learning dealing with language and its analysis from several points of view. The term includes the study of the pronunciation of a language, its inflexions or other means used to express the relations of words to each other in sentences, syntax, and the principles of word formation. It is also applied to the purely descriptive study of the phenomena presented by a given language at a given moment; to the historical treatment of these, showing the changes which take place in a

language from age to age and to a study based on a comparison of the phenomena existing in several languages sprung from a common ancestor

It is only comparatively recently thanks to the work of Henry Sweet (q.v.) that philologists have become fully alive to the fact that a language consists primarily of spoken sounds and only quite secondarily of written words. An example of the distinction between spoken and written grammatical forms is the fact that the *written* words back and bag both form their plural by adding the letter s but the spoken words form their plurals by adding the sounds s and z respectively. But this aspect of grammar can only be studied to a limited extent with reference to any but presently or recently spoken language and it in effect forms a separate science (see PHONETICS) which should be studied together with the other aspects of grammar.

Comparative and historical grammar is again a highly specialised study which for general and practical purposes is chiefly of value for such of its results as have been unquestionably established. It has explained for example how such apparently irregular plural forms as geese mice etc. are actually due to perfectly normal and regular changes.

The term *grammar* in its limited but most usually understood meaning is applied to the methods by which in a given language words are made to adapt themselves to certain changes of meaning (as of number or time) and are arranged in a recognisable relationship to one another so as to form sentences. It is precisely in this its commonest aspect that the study of grammar has until recently been shackled by the grammarians' attempts to force all languages to conform with the grammatical structure of Latin simply because that was the only language whose grammar was completely understood. Latin is of the greatest value as a basis for gram-

matical study but it does not contain every grammatical possibility within its limits. Latin grammar may profitably be taken as a type so long as it is not taken as a universal type of grammar.

The words of a language obviously cannot always fulfil the same function. They are classified into various parts of speech of which the following are recognised in English as in Latin.

Nouns The names of things persons or qualities

Adjectives which limit or qualify the meaning of a noun or pronoun

Verbs which express existence or action and by which it is affirmed that a noun *is* *does* or *suffers* something

Adverbs which limit or modify the meaning of a verb adjective or other adverb

Pronouns which take the place of a noun already mentioned or understood

Prepositions which show how one word stands in relationship to another

Conjunctions which join words or clauses together

Interjections exclamations having no grammatical relation to other words.

Each of these (except perhaps the last) is open to more or less sub-classification for which the reader is referred to any good book on English grammar.

The grammatical interrelationship of words in a sentence is shown by two main methods. (1) the order in which the words are placed. (2) inflexional changes in the words themselves. The inflexional endings which are added in many languages for example to nouns may be a survival of independent words which existed in the ancestral language but their use as inflexions characterises an earlier stage of linguistic development than that which depends upon word order and subservient words to determine the meaning of a sentence.

Thus the English language which originally was highly inflected is now only slightly so and has become mainly *analytic* that is its gram-

matal relations are analysed out into separate words. We can say either, inflexionally, *the King's son*, or analytically, *the son of the King*, whereas in French it is only possible to say *le fils du roi*. The Indo-European and Semitic families of languages have the most highly developed inflexional systems and the classes of words which are chiefly inflected are nouns, pronouns, verbs, adjectives, and adverbs. All these are still to some extent inflected in modern English, which, however, has lost its inflexions more than any other Indo-European language. The typical Indo-European noun, pronoun, or adjective is subject to formal variation depending upon its gender, number, and case.

The *gender* (masculine, feminine, or neuter) of a noun has (except in English, which is unique in having substituted natural for grammatical gender) no necessary relation to the sex or absence of sex of the object named by the noun. Thus the German *Mädchen* (girl) is neuter. But certain case-endings (declensions) are typical of each gender.

The *numbers* were originally three: singular (one thing), dual (two things), and plural (more than two things). The dual number has only a partial survival in ancient Greek, a very few relics in Anglo-Saxon, and some traces in a few living languages, e.g. Russian. But the inflexional distinction between singular and plural has survived even in English.

Case inflexions present a more intricate problem, because there are more of them. The case of a noun, pronoun, or adjective is determined by its grammatical relation to the rest of the sentence in which it occurs. English nouns have retained only one case inflexion, the possessive, as in "boy's" and "boys'", meaning "of boy" and "of boys", but the personal pronouns have kept both an objective and a possessive (he—him—his).

Latin nouns have regularly six cases: *Nominative*, the subject case,

Vocative, in which a person is directly addressed, *Accusative*, the object case, *Genitive*, the possessive case, *Dative*, the "giving" case, *Ablative*, the "taking away" case. Certain Latin nouns have also a *Locative*, or "place" case. Other languages have other cases to which various names have been assigned. (Finnish, for example, which is not an Indo-European language, has 15 cases.)

The functions of the 6 Latin cases may be illustrated in the following sentence, where each of the italicised words would, in Latin, appear in a case, in their order as given above:

"*John*, *sir*, sent the *book* of *my father* to *me* from the *shop*."

In Latin each of the italicised nouns and pronouns would have a characteristically different case inflexion. The inflexion of adjectives corresponds to that of nouns or pronouns, with which they agree in gender, number, and case, hence it follows that the Latin adjective is theoretically capable of 30 distinct forms, representing 6 cases each masculine, feminine, and neuter, in both singular and plural, whereas the corresponding English adjective has but one fixed form for all things. Adjectives and adverbs are also subject to inflexional change to indicate the degree, as in the English—*richer, richest, soon, sooner, soonest*.

The inflexion of the *verb*, of which there are many survivals in English, depends upon 4 considerations: voice, mood, tense, and person. Latin has three voices: *active*, in which the subject does something, and *passive*, in which the subject has something done to it.

In English the passive voice is expressed analytically by means of auxiliary verbs, but there is one survival of an inflexional passive in the archaic word "hight," which is called

The *mood* of a verb indicates the degree of certainty, probability, possibility, etc., of the action stated. Thus, in Latin, the indicative mood is used to state facts, the subjunctive to indicate possibilities, wishes, etc., and the imperative for commands.

moods were distinguished in Old English and the subjunctive even yet survives in certain uses. Tense determines the time of an action whether present past or future. English still has an inflected past tense. There are 3 persons both singular and plural (1) the person who speaks (2) the person spoken to (3) the person spoken about. All these originally had typical and distinct inflexions but in English apart from archaisms only the 3rd person singular of the present tense retains a separate inflexion. It is to a very great degree true that the grammar of a language is practically synonymous with its inflexional system. It follows then that bad grammar even in English consists largely in the misuse, misplacement or omission of grammatical inflexion or to confusion between different but similar forms.

Examples commoner than may be imagined are between you and I. I know who you mean. I'm going to lay down. He rung the bell — mistakes which are by no means confined to the confessedly uneducated.

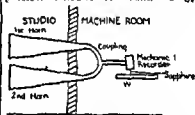
The fact that the function of many parts of speech can be performed by a phrase or clause containing many words leads to the various complications and intricacies of syntax (*q.v.*) and incidentally opens up a very much wider field for possible error.

CONSULT (English grammar) Henry Sweet *A New English Grammar Logical and Historical* (1899) (a more general view of the subject) O. Jespersen *The Philosophy of Grammar* (1924)

Gramophones. The gramophone is a development of Edison's phonograph by means of which he recorded and reproduced sound for the first time in the year 1877. The essential principle of recording consists in guiding a sharp cutter so that it cuts a spiral groove in a revolving wax cylinder as in Edison's machine or on a disc as in a gramophone. The cutter is attached to some means for moving it to and fro in accordance with the

sound waves which it is desired to record. Until quite recently this was effected by attaching it to a diaphragm which vibrated when exposed to the sound waves. Edison employed what is now called *hill-and-dale* recording: the sound vibrations move the cutter up and down so that the channel cut in the wax varies in depth. The present method is to vibrate the cutter from side to side and so produce a wavy groove. Either type of record can be reproduced by means of a diaphragm carrying a needle which rests in the groove as the cylinder or disc is turned round.

The first recording process was mechanical and involved the use of huge horns to intercept the greatest possible amount of sound energy.



Method of Horn Recording

It was however found impossible to construct cutters that would record low middle and high notes and very loud and very soft notes in the correct proportion. These troubles were all part of the original difficulty of lack of sufficient power in the sound wave. In the end electrical recording solved the problem by turning the varying sound waves into electric currents that varied in similar fashion as had been done in the telephone and then magnifying the currents by the use of valves that had already been used for a similar purpose in wireless. The magnified currents were altered in any required manner and finally used to work an electrical cutter that could be powerful enough to cut much bigger grooves in the wax and so give a more faithful record.

Modern Practice Recording The

aim of the engineer is to remove difficulties for the artist. The microphone is easier for the artist to use than were the old horns, but to-day the best artists employ a good deal of "microphone technique." The voice or instrument note is produced in certain ways at exact distances from the microphone, and "intimate" or "distant" effects obtained as required. Much of this handling of the microphone is being rendered unnecessary by the use of careful control apparatus by the engineers. Two or more microphones may be used in

There is to-day much dispute as to the type of studio to be used for recording. It was originally the fashion to use a "dead" studio—one without "room-tone" or echo. Recently it has become customary to use a "live" studio, with plenty of room-tone. It is a question of taste, and there is no ideal type of studio in this respect. In England and Germany at present live records are in fashion, but in America many of the best records are deliberately made quite dead.

The recording machine itself may be



Acoustical Recording by Dame Clara Butt (1920)
certain cases, and the currents from each "mixed" as required.

In the machine room the engineer has two important devices to assist him, in addition to the necessary apparatus for making the wax masters. These are the "monitor" and the "volume indicator." The monitor takes a sample of the electric currents which are actuating the recorder movement that is cutting the wax master, and allows the recorder to hear in a loud speaker beside him exactly what he is recording. At the same time the volume indicator tells him how loud is the record he is making. By means of his volume control and "mixer" he modifies the record as desired.



Electrical Recording by Dame Clara Butt (1933)
described as a very accurate lathe, designed to rotate a wax disc at a steady speed of 78 revolutions per minute. The slightest variation in this speed is fatal and leads to "wowing."

The recording machine is so arranged that the recorder movement is traversed radially across the rotating wax. Sometimes this is done by moving the turntable, sometimes by moving the cutter. In either case gears allow the cutter to produce grooves at a varying distance from one another. For a loud record the grooves need to be as far apart as possible to avoid the danger of one running into the next at a loud note; in this case

the grooves are cut with as few as 70 to the inch in other cases it is desirable to make a record to play for a long time then the record cannot be so loud but the grooves may be closer together. Ordinarily the grooves are not cut at more than 100 to the in but up to 250 to the in have been cut for special long playing records. A long playing record is always less loud or has less bass notes and usually does not wear so well as a record of shorter playing time.

The cutting of the groove is always done with a sapphire which is hard enough to withstand wear but soft enough to be ground by diamond dust without chipping. When no current is passing through the recorder movement that is when there is silence in the studio the sapphire

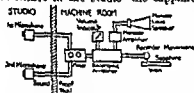
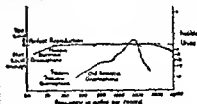


Diagram illustrating modern method of voice recording—cross microphone (wax record).

cuts a steady spiral path in the wax. When the currents generated by the sound arrive the sapphire vibrates from side to side and cuts a wavy line. The superiority of the electric recorder movement over the older mechanical recorders lies in the extra energy available for cutting the wax. Not only can louder records be made in this way but all the frequencies can be recorded in their correct proportion. This means that high notes, middle notes and low notes can all be recorded.

The actual frequencies of notes that are recorded give a good idea of the progress that has been made and also of the problems still to be solved. These vary from c 70 per second to c 20,000 per second. But the very high and the very low frequencies are not much used. Thus the lowest note on a

piano has a frequency of 25 and the top note a frequency of 4000 with harmonics up to c 8000. Careful tests have been made to discover

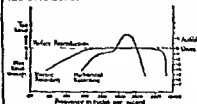


Frequency of Acoustic Notes Graph.

just how much of the frequency range may be safely omitted without seriously distorting ordinary music and speech and it was found that if all the frequencies below 40 and above 8000 were removed no appreciable harm would be done.

The best modern methods do actually record this frequency range. Unfortunately very few gramophones are capable of playing the whole range recorded. That is to say there is more music in most records than the average gramophone produces from them.

Reproducing. The non-electric or acoustic gramophone is still the most popular in this country in America it has almost disappeared in favour of the electric machine. However although the best electric machine is undoubtedly better than the best acoustic machine the electric



Frequency of Electric Notes Graph.

machine costs at least three times as much and is very difficult to keep in order.

The acoustic gramophone consists

of a turntable to make the record revolve, a tone-arm, and a horn. The tone-arm serves merely to connect the sound-box with the horn in a convenient manner while allowing the sound-box to travel across the record



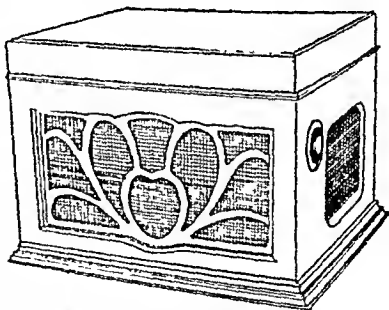
"Acoustic" Type of Gramophone in common use up to 1912

The essential of an acoustic gramophone is a sound-box connected to a horn. The function of the sound-box is to pick up the vibrations from the record, the function of the horn is to convey them to the air and so to the ear of the listener. Now it is possible to make a sound-box that is very nearly perfect, that is, a sound-box that will pick up all the sounds that are on the record in the form of a wavy groove and turn them into vibrations, but it is very difficult to make a horn that will transmit all the vibrations to the air in the correct proportions. To do so, the horn would have to be at least 40 ft long, and made to a very exact shape. This is commercially impossible. As a compromise, the sound-box is made to compensate to some extent for the deficiencies of the small horn that has to be used. The horn must be as big

as possible, and also as straight as possible. Thus the very best gramophones have very big straight horns outside any cabinet that may be provided for the motor. The next best have long horns curled up inside big cabinets, while inferior machines have very short horns, such as have to be used in portable machines.

There are four essentials in the electrical gramophone in addition to the motor and cabinet (which are similar to those used in the acoustic type): the pick-up for converting the wavy groove into electric current, the amplifier for magnifying these currents, the loud speaker for converting the magnified currents into sound, and the rectifier for supplying the power from the electrical mains (if batteries are used no rectifier is required). At the present stage of the development of the electric gramophone, the pick-up is usually fairly good, the amplifier very good, and the loud speaker not so good.

The results obtainable from a gramophone vary widely according to the type of room in which it is used, and even with the position of the machine in the room. Usually a



Radiogram Modern Combined Electrical Reproducer and Wireless Set

slight echo is to be preferred to a dead room. A good record played on a good machine should play for at least 40 times before any deterioration due to wear of the record becomes audible. It is very important to

change the needle every time if a steel needle is used. A worn needle means worn records. If it is desired to protect valuable records fibre needles or other non-metallic needles may be used, but the quality of the reproduction will suffer unless sound boxes or pickups especially designed for such needles are used. Indeed these needles should not be used without expert advice or assistance.

Gramophones often develop peculiar troubles for no apparent reason. Records sound out of tune, the motor runs down too soon, or bumps and clicks are heard. The troubles are often due to lack of oil in the motor. The remedy is obvious. Buzzes and rattles especially on loud notes are usually caused by a worn-out or a badly adjusted sound box or pickup but may be due to a worn-out record. In other cases the sound box may be too stiff in which case another must be substituted or the tone arm may need lubrication. A little oil or grease will usually cure this trouble. An automatic record changer gets a little stiff in use and requires attention at frequent intervals if records are not to be worn rapidly.

Processing. Originally only the wax master that had been cut by the sound waves was available to be played. The wax was fairly soft and wore out quickly so the total output obtainable from the wax was strictly limited.

Soon a method was devised of making copies of the master by a mechanical process of doubling, as it was called. Only about half a dozen doublings could be made however and high prices had to be charged for these to recover the cost of the recording.

Then the electro-plating methods of reproducing either cylinders or discs were discovered. It was found possible to render the wax master record conductive to electricity all over its surface by warming it until it was very slightly tacky and then dusting it with graphite. Later fine bronze

powder was used for the same purpose. The method with but slight modifications is in use to-day. The master is put in a bath and electro-plated. The copper shell is stripped off and used as a model for a further electro-plated copy. From this the stampers are made by yet a further plating. These stampers are backed with steel plates and faced with nickel and chromium to give rigidity and a durable surface and are then used to produce the records commercially known as pressings. These are produced in hydraulic presses at a high temperature. Two stampers produce each record one for each side.

The material for the records has varied a good deal from time to time but usually consists of a thermoplastic material such as shellac with



Section through tips of steel gramophone needles

a finely ground filler and sometimes a toughener like cotton flock.

It is interesting to note the modern revival of one of Edison's ideas applied with modern facilities as an alternative method. The waxes are placed in a vacuum chamber and gold is deposited in a very thin layer on the recorded surface by a process known as sputtering. It is claimed that surface noise is reduced.

Musical History of the Gramophone. The development of the gramophone from a toy into an instrument of ever increasing value to musicians and amateurs of music dates from the neighbourhood of 1900 when some famous artists who had previously refused to allow their voices to be recorded at last gave way. The first Caruso records which were made in 1902 were particularly valuable as a stimulus to the serious appreciation of the gramophone. Records

governed by a commission-manager, and lately has been much improved by widening of roads and extensive building. Chief industries are in gypsum and lumber, it also manufactures furniture, agricultural implements, carriages, paper, knitted goods, and rugs and carpets. Pop (1930) 168,600.

Grand Remonstrance, the demands presented by Parliament to Charles I in Dec 1641 the most important were to the effect that the King's ministers must be acceptable to Parliament, and an assembly of Protestant clergymen should decide the religious policy.

Granger, James (1723-1776). English divine and historian, published a *Biographical History of England* (1769). Blank leaves were left in the book for readers to insert their own illustrations. This gave rise to the term "grangerising," a supplementary illustration of books by means of inserted portraits.

Granicus, Battle of (the 334 B.C.) the Macedonians under Alexander defeated the Persians and Greek mercenaries under the Rhodian Memnon. It was the prelude to Alexander's conquest of Persia.

Granite, a combination of quartz, felspar, and usually mica. The texture is crystalline and coarse, and the dominant quartz and felspar give the rock a light colour. Accessory minerals are often present. Sometimes the crystals, especially of felspar, are very large, ranging from 1 to 12 inches in diameter. Granite originated by the cooling of an acid magma, under considerable pressure, at great depths in the earth's crust, and is the most abundant of the rocks thus formed. It is especially likely to be formed under mountain folds, so that, after erosion, the granite is exposed on the surface, and marks the axis or core of the range. It may also form large intrusive masses into any kind of overlying rock, and may cover quite a wide area of country. The adjacent rocks are usually considerably altered

by the granite intrusion, which sends out veins and dykes into the surrounding beds. The tors of Dartmoor are composed of granite weathered in columnar shape.

Granites are classified by mineral composition into alkali granites, calc-alkali granites, and andesites, which are intermediate between the other two. Almost all true granites contain dark mica, which imparts to them their speckled appearance, especially noteworthy in the grey Cornish granite, favoured for monuments and tombstones. This Cornish type contains also white mica, which causes the sparkle of paving-stones in sunshine. Granites vary greatly in colour. Generally potash granites are pink and calc-alkali granites grey or white.

Granites are almost universal in distribution. Other British examples are found at St. Davids, at Morriston, and at Sorrel in Leicestershire, at Eskdale in Cumberland, in the Cheviots, at Pen-y-Bryn, near Aberdeen, and near Dublin. There are good granites in New South Wales, S. Africa, and S. India, this being a peculiar type called "Charnockite." Granites are of great economic value as building stone, being very durable, and taking a good polish. They can be cut easily in any direction. Some contain mineral ores, and, by alteration due to hot vapours, may give rise to china-clay.

Grant, Ulysses Simpson (1822-1885). 18th President of the U.S.A. and noted soldier. He was born at Point Pleasant, Ohio, of Scots descent, and attended the military academy at West Point. As a second lieutenant he fought with gallantry in Mexico, after which campaign he gave up soldiering for farming. He joined the Federal troops on the outbreak of the Civil War, and quickly became brigadier-general, and victor of Fort Donelson (1862) and Vicksburg (1863) gaining him the command of the army in 1864. His campaign, involving great sacrifice of life among his own troops, was ultimately successful, and Lee's forces



ENGLISH HUNTING SCENE



JAPANESE COLOUR PRINT
(By Udamaro)

surrendered in 1865 after a series of fierce and bloody battles. Three years later he became President serving two consecutive terms. After retiring from office he became a partner in a banking firm which went bankrupt through the dishonesty of two of his co-partners with the result that he was ruined. He died 4 days after completing his memoirs.

Grantham, town in Lincolnshire. Its industries are the manufacture of agricultural implements tractors and harvesting machines for home and foreign markets. There are a 15th-cent. hostelry and a church of varied styles. Pop. (1931) 19,109.

Granville, George Leveson-Gower 2nd Earl (1810-1891) English statesman represented Lichfield in Parliament from 1841 till 1846 when he succeeded to the title. He was Vice-President of the Board of Trade (1848) and Chancellor of the Duchy of Lancaster (1854). The following year he was President of the Council under Palmerston an appointment which he again filled during Palmerston's next term of office after having himself failed to form a ministry. In 1868 he became Colonial Secretary in the first Gladstone Cabinet. He served two undistinguished terms as Foreign Secretary in the Liberal Governments of 1870-4 and 1880-5 and retired in 1886.

Granville, John Carteret Earl (1690-1763) an English statesman well versed in foreign affairs and Ambassador to Sweden (1719-21). He was Lord Lieutenant of Ireland from 1724 to 1730 and was appointed Secretary of State in 1742 under George II and was one of the King's favoured ministers. He was President of the Council from 1751 to 1763.

Granville-Barker Harley (b. 1877) English actor manager playwright and producer became joint manager with J. E. Vedrenne of the Court Theatre in 1904 producing many plays by Bernard Shaw Ibsen Galsworthy Maefield etc. produced Shakespearean plays on original lines at the

Savoy in 1912-14 public lecturer on the Art of the Theatre in Liverpool University since 1921. His dramatic works include *The Marrying of Anne Leslie* (1901) *Waste* (1907) *Madras House* (1910) and *His Majesty* (1918). He has translated Spanish plays by Martinez Sierra and the Quinteros.

Grape the fruit of the vine (*q v*)

Grape-fruit or *Shaddock* a large spherical yellow citrus (i.e. related to the orange and lemon) fruit so called because it occasionally grows in bunches. Having been long eaten in the W. Indies and U.S.A. it is becoming increasingly popular in Europe whether it is exported in large quantities from the U.S.A. and S. Africa. The juice is particularly beneficial more so than that of the lemon.

Grape Seed Oil, the fatty oil obtained by the expression or extraction of grape pips. It is chemically similar to castor oil in that it contains fatty acids with a hydroxyl group but it has no purgative action. The semi-drying oil is edible and is also used for the manufacture of soap and as a lubricating oil. The average yield on fresh pips is c. 10 per cent.

Grape Sugar the popular name for glucose (*q v*).

Graphite like the diamond is pure carbon crystallising sometimes in thin black flakes but more usually in layered masses or earthy lumps. It has a soft greasy feel usually soiling the fingers and is metallic in lustre. Chief deposits are in Ceylon, E. Canada and the United States. Vein deposits are worked at Borrowdale in Cumberland. Graphite is best known as the material used for lead pencils. It is used in making crucibles as a stove polish (blacklead) as a lubricant either alone or mixed with oil and to provide a conducting surface in electro-plating. A type artificially prepared in an electric furnace is used for electrical purposes. See also CARBON TECHNICAL FORMS OF.

Graptolites a group of extinct animals of the phylum Coelenterata (*q v*). They are confined to the

Palaeozoic era, and their remains, originally chitin, are usually carbonised, sometimes altered to pyrites or white sulphate of iron. They are typically branched forms, some profusely, but suppression or apposition of one or more branches may give rise to rod-like or leaf-like types. They are usually found in black shales or slates, and when carbonised bear a strong resemblance to pencil marks, from which circumstance their name is derived. They are generally small, mostly between 1 and 6 in in length, and their edges are typically toothed or lobed, each tooth representing the sheath wherein a single animal, a sort of polyp, lived. Thus the whole graptolite is the skeleton of a colony of such forms, many of which are like the Hydrozoa now living.

Graptolites are classified into two chief groups, the Graptoloidea, or typical graptolites with one or a few branches, and the Dendroidea, tree-like in form, and many-branched.

The Dendroidea were typically attached forms, and grew on the sea floor like the modern sea-fan. They arose at about the same time as the Graptoloidea, at the end of the Cambrian period, but never achieved the profusion or variety of form exhibited by the latter group. Nevertheless, due to their being an unprogressive group, they outlasted the typical graptolites, and reached the Carboniferous age.

The Graptoloidea were probably colonies suspended from the underside of drifting or attached seaweed, and some types may have been free-swimming. They thus attained a wide distribution, and it is this, coupled with the short existence of individual species, that makes them such excellent fossils for zoning and correlating the Ordovician and Lower Silurian shales, mudstones, and clays. Many species typical of beds in this country are found in places as far apart as America and New Zealand. Unhappily for the geologist, the Graptoloidea, as is always the case with progressive, temporarily success-

ful, groups of animals, soon died out, extending only from the top of the Cambrian to the base of the Upper Silurian system.

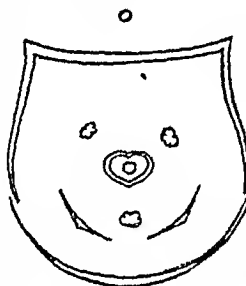
Grasmere, village in Westmorland, in the centre of the Lake District, famous for its associations with Wordsworth and the Lake School of poets and writers. The churchyard contains tombs of Wordsworth and of Hartley Coleridge. Every Aug it is the scene of an athletic meeting, at which wrestling is a great feature. Pop c 1200.

Grass Family, The Grasses form one of the largest single families of plants, and by far the most useful. There are over 4000 species, of which some 200 grow wild in England, and the

number of cultivated varieties is being increased enormously year by year. Grasses grow everywhere, they are a trouble to every gardener, springing up on every path and every

bed, they invade every patch of free soil that they can find, and their seeds lie dormant in the soil beneath other plants, waiting till their chance comes to force their blades up into the light, they grow on trees and on walls, down coal-mines, and on mountains, and in running and still water. They are successful in holding ground they have gained against practically every comer, and in spreading and multiplying and dispersing their seeds over the whole earth.

The general habit of grasses needs no description. The roots are usually fibrous and much branched, and spread a long way. One of the properties leading to the great success of the family, because the water-absorbing surface of the roots is very large. The



Floral Diagram of the Grass Family

GRASSES

wall
barleymarsh
bent grasscouch
grasscocks
foot
grassrye
grasssmooth
meadow
grass

mat grass

quaking
grassdecumbent
heath
grassYorkshire
fogmeadow
fox
tailbarren
brome

timothy

crested
dog's
tail grass

stem is enclosed and protected by the sheathing leaf-bases, and has hard knots or nodes at intervals. The leaves are long and narrow, and parallel-veined, so that by some botanists they are believed to be flattened leaf-stalks which have lost their blades in the course of geological time. The flowers are arranged about a central stalk or *rachis*, and when these florets have stalks, the inflorescence is called a *panicle*, but a *spike* when the florets are sessile (*i.e.* sitting, or without stalks). The individuals of which a spike or panicle is composed are called *spikelets*, and each spikelet has one or two covering scales, called *glumes*, at its base. Within these are two thin scales called *paleæ*, and alternating with these are two small, very thin scales called *lodicules*, which correspond to petals or sepals. Three anthers on long slender filaments surround the single ovule, which has one or two styles and feathery stigmas.

Common wild grasses are the sweet-scented vernal grass, which gives the sweet smell to newly-cut hay, the meadow fox-tail, which bears long, upright spiked panicles, of a beautiful blue-green colour, and is one of the most valuable of all British grasses for feeding sheep, cattle, and horses, common cat's-tail grass is one of the commonest grasses of fields, woods, and roadsides in late summer, and forms good pasture. Large areas of this grass are cultivated in the United States. Soft brome-grass has a beautifully soft panicle of egg-shaped, ten-flowered spikelets on hairy branches. It grows among summer hay, but is of little use for food. The hairy wood brome-grass is a tall grass, some 3 ft high, common in shady woods, and, though useless for agriculture, the most beautiful of all English grasses in its slenderness and grace.

A number of grasses perform a most useful work on sea coasts, where their roots bind together the loose sand and their prostrate stems cover and protect it from the wind, and build up sand dunes which prevent inroads of the

sea. The common sea reed is planted extensively here, and the upright slyme grass in Holland, for this purpose.

Corn, a name applied to different cereals in different countries, is always the fruit of a member of the grass family. Corn in America means maize, in China rice, in Scotland oats, in Norway barley, in S Germany wheat, and in N Germany rye. The cereals are all typical fruits of the family, solitary, round or long, and deeply cleft on one side. The food is stored within the seed for the development of the embryo, which is always tiny and has one cotyledon only.

Grasshoppers, various insects of the order *Orthoptera*, belonging to the families *Locustidæ* and *Acerididæ*. Most are green, but a few are brown. The green grasshopper of Britain is c 1½ in long, but some tropical species are much larger. They are remarkable for their long hind legs and power of jumping. Most grasshoppers feed upon plants, but a few eat caterpillars and small insects. They are almost universal in distribution. The *Locustidæ* have long antennæ and a long ovipositor in the female, and chirp by rubbing the wing cases together, the *Acerididæ* have short antennæ and ovipositor, and chirp by rubbing the wing case against the leg.

See also LOCUST, ORTHOPTERA

Grassing, see BLEACHING

Grattan, Henry (1746-1820), Irish statesman. He was elected to the Irish Parliament in 1775, where he made remarkably eloquent speeches made deep impression. A fervent nationalist, Grattan was instrumental in gaining the independence of the Irish Parliament. In 1792 he was successful in securing the passing of the Bill giving Roman Catholics the franchise, but his Reform Bill was thrown out, and he retired in 1797, but returned to Parliament in 1800, and became M.P. in the British Parliament, 1801. The last cause he championed was Catholic emancipation.

Gravel, a mass of loose rock fra-

ments rounded by water and deposited without regard to size so that large and small pebbles and sand all occur together. Gravel deposits are generally due to the sudden checking of fast moving water as when a river enters an inland lake or along storm swept coasts. The term is applicable to the pebble or shingle beaches such as Dungeness and the Chesil Bank (qv) which are now being deposited along projections of the British coast.

Raised beaches (qv) deposits of gravel in areas subject to recent glaciation at a height well above present sea level represent a previous level of the sea. Gravel deposits are also laid down by floods in river valleys where they may also mark old levels of the river as in the Thames valley.

Gravelotte, Battle of (Franco-German War) (Aug 18 1870) the Germans under King William of Prussia gained a decisive victory over the French under Marshal Bazaine near Metz.

Graves, Alfred Perceval (1846-1931) Irish author was a leader of the Celtic revival and Secretary of the Irish Literary Society. He published several collections of songs and ballads and of original poems. Of the latter *Father O'Flynn* is the best known.

Graves, Robert Banks (b 1895) English poet son of Alfred Perceval Graves (qv). His works include *Collected Poems* (1927) and several critical works e.g. *Poetic Unreason* (1915) *Contemporary Technique of Poetry* (1915) and *Good Bye to All That* (1919).

Gravesend, a Parliamentary and municipal borough river port and market town of Kent England c 20 m E of London on the S bank of the Thames estuary opposite Tilbury with which it communicates by ferry. Its history dates back to pre-Norman times. In 1380 it was partly burnt by the French. It received charters in 1566 1568 and 1687. It is the chief station for E. Indianmen and receives local river traffic. Shipbuilding iron founding brewing and shrimp fishing are industries and

import trade in coal lime and timber is carried on. Pop (1931) 35,000.

Gravitation, the attractive force exerted by every particle of matter upon every other particle varying directly as the product of the masses of the particles and inversely as the square of their distances from one another. Newton perceived that Kepler's Laws (see *ASTRONOMY*) for the motions of the planets would follow from the existence of a force of attraction upon them exerted by the sun and varying as the square of the distance. He calculated the acceleration of the moon towards the earth (c 0.0089 ft per second per second) and compared it with the force exerted on a body at the surface of the earth which gives an accelera-

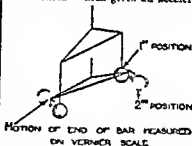


Diagram of Michell-Cavendish Experiment

tion of 32.2 ft per second per second (see *DYNAMICS*). These two should be in the ratio of the square of the radius of the earth to the square of the earth's distance from the centre of the moon. He was also able to give a rigorous proof that the force of gravity exerted by a sphere such as the earth upon a body near its surface is exactly equal to that which it would exert if the whole of its mass were concentrated at its centre. Newton published his theory in 1687 in his famous *Principia*.

Astronomical data can tell us only the relative strength of the force of gravity not the absolute value of the attraction between known masses. This can be decided only by direct experiment. When we know the force with which say two masses of

1 gramme attract one another, when placed at a distance of 1 centimetre apart, we can calculate the attraction between any other two known masses placed at any distance apart. Knowing the attraction of the earth for a given mass, we can calculate the mass and mean density of the earth.

Henry Cavendish was the first to make an accurate determination of the constant by a method planned by the Rev John Michell, who also built an apparatus but did not live to use it. His method consisted in determining directly the attraction exerted by a sphere of lead 12 in in diameter upon one 2 in in diameter. Two spheres of the latter size were hung from either end of a horizontal rod 6 ft long suspended from its centre by a fine wire. These two spheres were attracted by two large spheres so set as to pull them at right angles to the rod in opposite directions. The apparatus was so arranged that the two large spheres could be turned right round through a semicircle so as to pull the small spheres in the opposite direction. The difficulties in this experiment lie in getting the whole apparatus so steady and free from disturbances due to air currents, slow change in the suspension wire, and other troubles, that the minute force can be observed. This experiment of Cavendish's was in many ways the pioneer effort of all exact physical measurements. The result was also surprisingly good, the density of the earth working out at 5.448, the best value known at present being 5.53.

Until recently the variation in the force of gravity in different parts of the earth was determined by means of observations of the time of the swings of a pendulum (gv). The pendulum used was invented by Kater, and depends upon the fact that if a rod carrying two knife edges and provided with sliding weights be adjusted so as to swing at the same rate about each of the knife edges, the distance between the latter will be exactly equal to the length of the theoretical "simple"

pendulum (see DYNAMICS). Observations with this apparatus are very laborious, and though it is valuable for finding the value of gravity at a fixed station, such as a physical laboratory, it is not suitable for field work. Owing to the fact that determination of local variations in the value of gravity are now valuable for determining the nature of mineral deposits, great efforts have been made to produce portable apparatus suitable for rapid and direct measurement. The value of gravity at any place is also subject to slight variation due to various causes, such as the position of the moon, and the state of the tide if the sea is near.

Gray, Thomas (1716-1771), English poet, was a friend of Horace Walpole. He spent a reserved and eventless life in Stoke Poges and Cambridge. His works show a reaction against the classical frigidity of the 18th cent., and presage the romantic revival of the early 19th century. His prevailing melancholy mood is seen at its best in his famous *Elegy* written in a *Country Churchyard* and in his *Ode on a distant*



Stoke Poges Churchyard, Bucks. Thomas Gray, who is buried here, is said to have sat on the tomb in the foreground when composing the "Elegy."

prospect of Eton College (1749) His Pindaric odes *The Bard* and *The Progress of Poesy* (1757) constitute a masterly handling of a difficult form. Greek, Norse and Welsh influences are observable in his verse.

Graz, capital of Styria, Austria, is an industrial centre possessing iron and steel works, chemical factories, brewing and distilling, optical and surgical instruments, printing and allied trades. From outlying districts wheat, rye and barley with roots and fruit are brought to the weekly market. The late-Gothic cathedral was erected by Frederick III (1456) and the University was founded in 1585. Pop. 165,000.

Great Barrier Reef, see AUSTRALIA.

Great Bear, see CONSTELLATION.

Great Bear Lake in the N.W. Territories, Canada. For the greater part of the year it is frozen over, but when free of ice fishing is good. Area 11,700 sq. m. Its outlet, the Great Bear River, flows into the Mackenzie River.

Great Britain, as a name for England, Wales and Scotland taken together, was officially adopted in 1707 after the Union with Scotland. The constituent countries will be found dealt with each under its own name. Great Britain is the largest European island and has a total area (including the Isle of Man and the Channel Islands) of 89,041 sq. m. Its extreme points are: N. Dunnet Head, Caithness, 15 m. W.N.W. of John o' Groat's; S. Lizard Point, Cornwall; E. Lowestoft Ness, Suffolk; W. Ardnamurchan Point, Argyllshire. Its greatest length N.-S. is 605 m. and its extreme width 370 m. The distance by road from Land's End to John o' Groat's is 875 m. The highest mountain is Ben Nevis, Invernessshire (4408 ft.), the largest lake Loch Lomond, Stirlingshire and Dumbartonshire (23 m. by 4-5 m.), the longest rivers the Severn (220 m.) and the Thames (10 m.). See also ENGLISH HISTORY, PARLIAMENT.

LAW, **PUBLIC FINANCE**, **CONSTITUTION**.

Great Dane, a breed of large dogs also called German boarhound, derived from a cross of mastiff and greyhound.

Great Lakes, The, a system of lakes and connecting waterways in N. America lying partly in the U.S.A. and partly in Canada, open to navigation by vessels of both nationalities. The actual surface covered by this system is 96,000 sq. m. The lakes are in order of size: Superior, Huron, Michigan, St. Clair, Erie and Ontario. The rivers are in order of length: St. Lawrence, St. Mary's, St. Clair, Detroit, Straits of Mackinac, Upper Niagara, Lower Niagara. A system of locks negotiates St. Mary's Falls and dredging is done periodically. The Welland Canal enables vessels to avoid the falls and rapids of the Niagara R. There are many ports on the Great Lakes and continuous services of freight and passenger steamers. Power is generated from the Niagara Falls both on the United States and the Canadian shores.

Great Rebellion, see WAR, THE CIVIL.

Great St. Bernard Pass, the easiest pass over the Pennine Alps between Valais and Piedmont, connecting Switzerland with Italy. It reaches a height of 8111 ft. It was used by Napoleon when leading his forces into

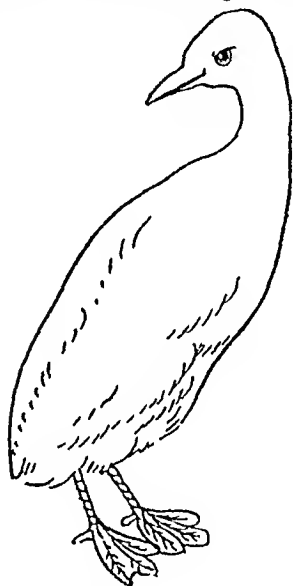


The Pass showing the World-famous Hospice. The dog in the foreground is of the St. Bernard breed.

Italy (1800) The famous hospice, from which the St Bernard dog derives its name, was founded in the 10th cent There is a mountain road across the pass

Great Salt Lake, an extensive stretch of water 75 m long and in parts 50 m broad in Utah, U S A Its waters contain c 14 per cent of mineral salts It was first explored by Colonel Frémont in 1843

Grebes, a family of freshwater birds related to and resembling the true



Grebe

divers (*gu*), but distinguished by having incomplete webs represented by flaps of skin on the toes Most familiar is the great crested grebe, widely distributed in the N hemisphere and resident in Great Britain, where it usually breeds in marshes, making its nest of water weeds It is more than 1½ ft in length, has a white breast, a chestnut back, a ruff of feathers on the cheeks, and two tufts on the head Well known, too, is the little grebe or dabchick, very similar in habits, but only c 9 in long and without crests

Greece (*Hellas*), republic occupying the S extremity of the Balkan Peninsula, and including several groups of islands in the Aegean and Mediter-



Patras, Greece The once-important Fortress leading to the Gulf of Corinth and Corinth Canal

Area, 50,300 sq m.; pop. 6,204,000 The capital is Athens

The mainland of Greece is bounded on the N by Albania, Yugoslavia, and Bulgaria, and on the NE by Turkey. The coast-line is very deeply indented, the Peloponnesus in the S being almost separated by the Gulfs of Corinth and of Aegina, which leave the slender Isthmus of Corinth as a land-bridge between N and S In the N is the Chalcidice Peninsula, with its three tongues (easternmost ending in Mount Athos) projecting into the Aegean Sea The principal islands are Crete, Eubœa, the Ionian Islands, the Cyclades, and the N Sporades Most of the S Sporades, comprising the Dodecanese, belong to Italy, though claimed by Greece

The whole country is extremely mountainous The line of the Pindus range, running generally N and S, is continued across the Gulfs of Corinth by the Peloponnesian range ending in Taygetus (7904 ft) In central Greece three ranges branch off to the E—Othrys, Ceta (7080 ft), and Parnassus (8065 ft) Separated from Parnassus by the valley of Delphi is Kiona (824 ft), the highest mountain in "old Greece In the N of Thessaly rise

Mount Olympus (9754 ft.) The Attic Plain containing Athens is separated from Boeotia by an amphitheatre of mountains including Cithæron Parnes Pentelcus and Hymettus In the Peloponnesus Arcadia is almost completely surrounded by lofty mountains much of Arcadia itself being a high and sometimes bleak plateau averaging 4000 ft. above sea level Nearer the sea are the plains of Elis (with Olympia) watered by the Alpheu in the W. and of Messenia and Laconia (watered by the Eurotas) in the S. in the E. is the Argolic Plain containing Argos Aegialia Mycenæ and Tiryns

The chief rivers of central Greece are the Arta (Arachthus) and Achelous



The Ktasia worn by Greek Hillmen has been adopted by several Greek Regiments.

flowing into the Gulf of Arta and the Ionian Sea respectively and the Hellada or Spercheus flowing into the Gulf of Lamia In the N. the

Peneus and Vardar flow into the Gulf of Salonica and the Struma into the Gulf of Rentina

Minerals include lead iron copper



The Corinth Canal

aluminium lignite and nickel In antiquity the silver mines of Laurium (Attica) were famous

The chief agricultural products are wheat currant grape grown chiefly in Peloponnesus olives (mainland Greece and Ionian Isles) tobacco (Macedonia) and figs Olive oil wines (some much resinated) and tobacco are exported The marble quarries of Pentelcus and Hymettus which supplied the marble for ancient Greek buildings are almost exhausted Oriental carpets and rugs are made by repatriated Greeks who learnt their trade in Asia Minor

The difficulties of communication due to the mountainous nature of the country have favoured in the past the existence of independent city States Even to-day communications are very poor Roads generally are bad and impassable in wet weather The best roads are those built by the British in

the Ionian Islands during their protectorate. The railway system (*c* 1670 m) has hardly developed at all since the completion of the main Athens-Salonika line in 1916. The Corinth Canal (4 m) through the Isthmus of Corinth, contemplated by Periander, begun by Nero, but not opened till 1893, has improved sea transport between W Europe and the Piræus. Air services are developing. Athens (Phaleron Bay) is connected by air with England and W Europe, and with Constantinople, Crete, Alexandria, Bagdad, India, and the Far East.

The country is divided into the following nomes, or departments:

Peloponnesus—Achaia and Elis, Corinthia and Argolis, Arcadia, Messenia, and Laconia.

Central Greece—Attica and Bœotia, Phthiotis and Phocis, Acarnania and Ætolia, Larissa, Trikkala, Arta, Yanna, Preveza, and Eubœa.

Macedonia and Thrace—Florina, Kozane, Pella, Salonika, Seres, Drama, Kavala, Rhodope, Chalcidice (with Mount Athos), and Evros.

The Ionian Islands are divided into three departments (Corfu, Cephalonia, and Zante), Crete into four (Heraklion, Canea, Rethymno, and Lassithi), the Ægean islands of Samos, Lesbos and Chios each form one department, and the Cyclades another.

The largest towns are Athens, the Piræus, Salonika, and Patras. The chief ports are the Piræus, Salonika, Patras, Volo, and Alexandroupolis (Dedeagatch).

Government. The republic was established by plebiscite on April 13, 1924. There are a President, a Senate (120 members), and a Chamber of 200-250.

See *ÆGEAN CIVILISATION, GREEK HISTORY*.

Greek Architecture. The architecture of classical Greece developed after the Dorian invasion (*c* 1100 B C), and it is not clear to what extent it was indebted to the buildings erected in primitive times by the earlier inhabi-

itants of Greek lands (see *ÆGEAN CIVILISATION*). The introduction of stone columns in place of their wooden predecessors, developments of the primitive unhewn tree-trunk, led eventually to the three characteristic orders of Greek architecture, named after the three differentiated types of column which they used—the *Doric*, marked by intersecting fluting, a square, simple abacus, and the absence of a separate base, the *Ionic*, with a distinct base or plinth, the flutes separated from each other by flat fillets, and a scroll figured capital or volute, the *Corinthian*, later and less popular than the other two, developed from the *Ionic*, but more highly embellished, with its capital bearing the characteristic acanthus decoration.

The finest and most characteristic product of Greek architecture was the temple, generally built on rising ground, and intended principally as a shrine for the statue of the god worshipped there. Typically the Greek temple consisted of a rectangular court or *naos*, flanked with colonnades, and a *pronaos* or outer court, the whole surrounded by a peristyle itself flanked with columns. By the 7th cent B C the brick walls and wooden columns of the early Greek building had given place to stone, and the great period of Greek architecture had begun, but most of the masterpieces by which it is typified to the modern admirer were erected between the battle of Salamis (480 B C) and the death of Alexander (324 B C).

The first great work of the *Doric* order was the Temple of Hera at Olympia (*c* 7th cent), in which the original wooden columns were gradually replaced by stone ones. But the *Doric* style rose to its greatest achievement in the Temple of Zeus at Olympia (early 5th cent) and the Parthenon or Temple of Athena at Athens (447-432 B C). An early example of the *Ionic* Order is the Temple of Nike Apteros at Athens (*c* 450), its characteristics appeared more perfectly in the Erechtheum, likewise situated on the Athe-

an Acropolis unique in that its portico of the Caryatids has its roof supported not by columns but by six figures of maidens larger than life size standing on a parapet 8½ ft high. One of these Caryatids may be seen at the British Museum. The Corinthian Order is well exemplified by the Temple of Zeus Olympius at Athens erected c. 460-447 B.C. and the Tower of the Winds (c. 50 B.C.).

Many of the greatest productions of the architectural genius of Hellas were to be found not in the Greek homeland but in the greater Greece beyond the seas. The great Temple of Diana at Ephesus, accounted one of the Seven Wonders of the World of which many remains may be seen in the British Museum was one of the greatest triumphs of the Ionic order. In Sicily and Italy the temples of SYRACUSE Agrigutum the so-called Basilica at Eratum and the Temple of Poseidon in the last mentioned city are worthy of particular remark.

The later or Hellenistic period of Greek architecture subsequent to Alexander is marked by an increase of external embellishment and the greater popularity of the Corinthian style. Many of the greatest monuments of this period are civic buildings such as theatres, colonnades, monumental altars etc. The Roman annexation of Greece produced great if largely imitative architectural activity, the reign of Hadrian (A.D. 117-139) being especially marked by extensive building operations in the Greek lands. See also CORINTHIAN ORDER, DORIC ORDER, IONIC ORDER.

Greek Church, see EASTERN ORTHODOX CHURCH.

Greek Fire, flaming material used as a war weapon in classical and mediæval times. Liquid fire was used by the Assyrians and various methods of employing the flame of pitch and sulphur were tried by the Spartans. A peculiar wet fire was invented by an architect named Callinicus about the year A.D. 660 and was probably composed of quicklime, naphtha and

sulphur being instantly inflammable on contact with water. It was much used by the Byzantine Greeks and the secret of its manufacture carefully guarded. See also EXPLOSIVES.

LAMB THROWER.

Greek Games, see GAMES, GREEK.

Greek History. The history of Greece may be said to begin with the Dorian invasion (traditional date 1104 B.C.) though hardly anything is known of the period from the 17th to the 13th cents B.C. The period before the Dorian invasion is dealt with under Ægean Civilization (q.v.). It may here be mentioned that the immediate predecessors of the Dorians were the Achæans (q.v.) invaders from the N. who had penetrated all over the Peloponnese absorbing but not destroying the Mycenaean civilization that they had encountered. Under the leadership of a great king, whose seat was at Mycenæ, they became the dominant race in S. Greece, the king of Mycenæ being the overlord of smaller realms such as Ithaca, Phylas and Sparta to say nothing of more distant dependencies. The Achæans were strong enough to undertake two wars against Troy in the second of which they razed Thebes to the ground (traditional date 1104 B.C.). Their age, the Heroic Age, is vividly mirrored in the pages of Homer. The question arises why a race so virile and so enterprising should have fallen such an easy prey to the Dorians. The answer is perhaps found in the Trojan War.

Tradition reflected in the *Iliad* and supported by archaeology tells us that Agamemnon, king of Mycenæ and head of the Greek confederation, collected a vast force from all over Greece and embarked in a great war against Asia Minor. This war dragged on for 10 years and like the modern World War did the victors—in this case the Greeks—almost as much harm as the vanquished. The survivors of Agamemnon's host returned to Greece, some of them like Ulysses having surprising adventures on the way, all of them

leaving the flower of their generation dead in Asia Minor. Though 80 years are said to have elapsed between the fall of Troy and the coming of the Dorians, the Achæans were unable to withstand the victorious onslaught of their enemies who, like themselves, were invaders from the N. While it would be fanciful, in dealing with a prehistoric people, to speak of an economic depression following a devastating war, it must be remembered that the Mycenæans and Achæans were highly civilised and doubtless had to face political and economic problems of which we have little idea.

The Dorians found a great civilisation and left a desert. They slew, enslaved, or drove out the Achæans, burning their cities and destroying their culture. They did more. Down to the 12th cent. B.C. the inhabitants of Greece had been imbued with the spirit of nationalism. The Dorians substituted the parochial outlook. From the Dorian invasion to the Greek War of Independence—over 3000 years—there was no sovereign and united Greek nation. Instead we find during the period of freedom, a series of autonomous city States whose extent often fell short of that of an English parish and never exceeded that of a small English county. From time to time one or other of the more important States acquired the ascendancy, or hegemony, over the others. Thus in historic times Sparta, Athens, Sparta again, and Thebes all held the leadership in turn. This leadership was almost always exercised through a league or confederacy, thus we have the Peloponnesian and Boeotian leagues and the Confederacy of Delos. By means of the last, which was in effect an acknowledgment of her command of the sea, Athens was able to create and consolidate her maritime empire. Sometimes these leagues were formed by cities which may have hoped for but never obtained the hegemony, e.g. the Achæan and Ætolian leagues. Other leagues, such as the Amphic-

tyonic and Calaurian leagues, were primarily religious. Such unity Greece possessed under Macedon was the unity of a subject rather than of a sovereign State. The only time when free Greeks thought of themselves as belonging to one nation was when they consulted the oracle at Delphi, and when they competed in the Olympic Games. During the period of the Sacred Truce the Greeks at Olympia temporarily forgot their parochialism and remembered that they were Greeks.

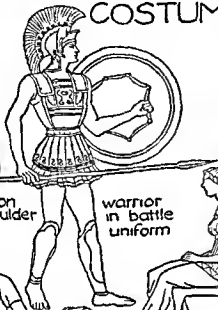
The Dorian invasion, like so many prehistoric migrations, was doubtless due to pressure of surplus population. The race inhabiting Epirus moved into Thessaly, driving the inhabitants on into Boeotia. At the same time invaders from the small district of Doris, just S. of Thessaly, crossed the Gulf of Corinth into the Peloponnesus. According to tradition there was a threefold invasion, led respectively by Temenus, Cresphontes, and Aristodemus, descendants of Hercules. Guided by a one-eyed Ætolian called Oxylus, they crossed from Naupactus, and conquered the whole of the Peloponnesus except Arcadia. Temenus obtained Argos, Cresphontes Messenia, and the twin sons of Aristodemus (who died *en route*) Laconia. The conquerors gave Oxylus Euboea for his help. Meanwhile, the surviving Achæans were driven into the historic Achæa (*qv*), or out of the peninsula altogether. Some escaped overseas to Asia Minor, where they eventually founded cities. Others fled to their Ionic kinsmen in Attica, which was outside the direct line of invasion. The fact that in historical times Greek settlers on the coast of Asia Minor divided themselves into Æolians, Ionians, and Dorians suggested to the Greeks a genealogy, which at the same time explained why they called themselves Hellenes.

Hellen, son of Deucalion (*qv*) and Pyrrha, was king of Phthia in Thessaly. He had three sons, Æolus, Dorus, and Xuthus. Xuthus had two sons, Ion

ANCIENT GREEK COSTUME



female
with chiton
over shoulder



warrior
in battle
uniform



basket
carrier



Greek lady



peasant in
petasos(soft cap)



priestess
in peplos(outer garment)



male in chlamys
(mantle)and cap

and Achæus Thus Hellēn was the ancestor of all the Greeks, and Æolians, Dorians, Ionians, and Achæans are all accounted for

Among the Peloponnesian Dorians the Spartans gradually became predominant Unlike the other Dorian invaders, Argives and Messenians, who tended to coalesce with the conquered population, the Spartans came as conquerors and remained a military garrison They divided up the inhabitants of their territory into three sharply defined classes Spartan citizens, *Periæci* (" dwellers round about "), who were free men without civic rights, and *Helots*, or slaves Surviving members of conquered States automatically became helots Before the 8th cent B.C. the Spartans had developed an oligarchic constitution, ascribed to a mythical lawgiver Lycurgus (traditional date 885 B.C.), which made them a nation of soldiers Towards the end of the 8th cent they subdued Messenia in a war which lasted 20 years (c. 743-723 B.C.) The second Messenian War (c. 685-668), which began as a revolt from the Spartan yoke, ended with the complete subjugation of the country Those Messenians who could not escape were enslaved As the Spartan dominion expanded and the numbers of the helots increased, it became more and more necessary for the Spartan Army to maintain its efficiency Consequently the Spartan citizen had no option but to become a soldier He was freed from the necessity of earning his living, since the ordinary business of the State was undertaken by the *Periæci*, assisted by the helots Sparta now had designs on the rest of the Peloponnesus She wrested Thyreatis from Argos (c. 550 B.C.), and attempted to conquer Arcadia But she was checked by the resistance of Tegea, which, though defeated, was not enslaved Henceforth, Sparta had to be content with alliances rather than conquests She became the acknowledged leader of the Greeks, and the head of the Peloponnesian League

Meanwhile, Ionian Attica had been formed into one State by the synœcism (" joining together ") of various small villages The traditional inventor of this union was the hero Theseus, a legendary King of Athens Absolute kings disappeared with the institution (c. 1088 B.C.) of the office of archon, or regent, though a kind of king (king-archon) persisted throughout independent Athenian history Thus were sown the seeds of democracy that were to reach their fruition under Pericles and Ephialtes We must not overlook the early date of the cleavage between oligarchic Sparta and democratic Athens that was to destroy all possibility of a united Greece while these two rival powers flourished

About the 7th cent B.C. a common form of government was tyranny A tyrant was an absolute ruler who had obtained his position by unconstitutional means He did not necessarily rule " tyrannically " He would today be called a dictator In c. 632 B.C. Cylon, son-in-law of a Tyrant of Megara, made an abortive attempt to seize the supreme power in Athens War with Megara resulted Popular discontent with the government of the day was followed by a written code of law ascribed to Draco (621 B.C.) Draco's code was of great benefit to the Athenian citizens, since they were now saved from illegal administration, but the code was proverbial for its harshness, most of the listed offences being punishable by death Thirty years later Solon (archon eponymous c. 592 B.C.) effected many social and political reforms with a distinctly democratic orientation But his reforms were premature, for in 570 his friend Pisistratus seized the government and made himself tyrant. His rule was wise and beneficial, and Herodotus, Thucydides, and Pausanias unite in giving him praise His son Hippias (c. 527-510) carried on the tradition The tyranny accidentally came to an end as the result of a private grudge, though the tyrannicides Harmodius and Aristogiton were later revered as

heroes The Pisistratids were driven out with the help of Sparta In consequence Sparta forced Athens to join the Peloponnesian League and to acknowledge the hegemony of her future enemy Hippias fled to the Court of King Darius cherishing hopes of his reinstatement with Persian help Thus the tyrants were expelled at the cost of two entanglements Sparta and Persia and the results of these entanglements were far reaching

Another result of the Dorian in

founded in Italy Sicily S France N Africa Asia Minor and even on the Black Sea Some became more important than their founders e.g. Byzantium founded by Megara Again colonies themselves founded further colonies Syracuse founded by Corinth was the mother-city of several other colonies The colonies particularly in Ionia became centres of philosophy art and literature we have only to mention the philosopher Thales of Miletus the painter Apelles



Greek 1) 2 figure amphora 3 4 half of 5th c. c.

vasion must now be noted When the dispossessed Achaeans founded cities in Asia Minor they showed the way to the colonisation that was to be so important a feature of Greek history (see COLONY) The Greek colony was an independent city State owning no allegiance to its mother city and united if at all by sentimental ties only Indeed some colonies were on very bad terms with their founders the most notorious example being Corcyra and Corinth The main effect of Greek colonisation was to spread Greek culture far and wide over the Mediterranean Colonies were

of Colophon and the poet Anacreon of Teos

The colonies in Asia Minor provide the key to the Greek history of the 5th cent B.C. In 550 B.C. they were subdued by Croesus (qv) King of Lydia On the fall of Lydia they passed under the control of Persia In 498 the Ionians revolted from the Persian yoke and appealed to Greece for help Only Athens and Eretria responded but even with this slight help much was done and Sardis the former capital of Lydia was burnt Darius quickly suppressed the revolt and then determined to punish the

presumptuous Greeks. He sent an army into Greece under Datis and Artaphernes, which burnt Eretria and then attempted to deal with Athens. With the now aged ex-tyrant Hippias to guide them, the Persians landed at Marathon in 490. Here they were defeated by the Athenians under Miltiades, almost unaided. Their only allies were a thousand Plataeans, since the Spartans had so far forgotten the duties attendant on the position of leader of the Greeks as to be too late to help. The battle of Marathon, though it has pride of place in Creasy's *Fifteen Decisive Battles of the World* was actually nothing more than the defeat of a punitive expedition. Its moral effect was, however, tremendous, since it showed that the Persian "Immortals" were not invincible.

Ten years later Xerxes, who had succeeded his father Darius, determined to conquer Greece once and for all. In 480 he crossed the Hellespont and proceeded to invade Greece by way of Thrace and Thessaly, accompanying the movements of his army with a gigantic fleet. The Greeks, united for the first time since the Dorian invasion, abandoned N. Thessaly, and decided to hold the pass of Thermopylae only, because a providential storm had wrecked many of the Persian ships at Artemesium. The pass was gallantly defended by the Spartan king Leonidas and the invaders could make no progress until they learnt of the existence of a mountain path by which they were able to take the defenders in the rear. Once through the pass the rest of Greece lay open to them. Boeotia had already submitted and Attica was defenceless, the land forces of the Greeks having concentrated in the Peloponnesus. Fortunately, the Athenians had in Themistocles a statesman of foresight. Some time before he had persuaded them to devote the surplus profits of their silver mines at Laurium to the building of a navy. Now that the critical time had come he induced his fellow-citizens to abandon their

capital to the enemy and to trust themselves to their "wooden walls," in obedience to an oracle. The Athenian fleet and their allies concentrated in the strait between the island of Salamis and the mainland of Attica and in the ensuing battle of Salamis the Persian fleet was utterly destroyed. Salamis rather than Marathon deserves to be called a "decisive battle of the world." This sea-fight was followed in 479 by the land-battle of Plataea, in which the allied Greeks under the Spartan regent Pausanias routed the Persians under Mardonius. On the same day the Greeks defeated the remnant of the Persian land and sea forces at Mycale, in Ionia.

The result in Greece of the Persian wars was that the leadership of the Greeks passed from Sparta to Athens. Throughout the campaigns Athens had displayed far more vigour than Sparta, meeting the Persians almost single-handed at Marathon and taking the initiative at Salamis. Not even the devotion of the Spartan king at Thermopylae or the strategy of the Spartan regent at Plataea was able to remove the impression of Lacedaemonian remissness. Sparta's prestige suffered, and her hegemony lapsed.

Once the Persian danger was over, the Greeks, under their new leader, took steps to prevent a recurrence. In 178-177 the Delian Confederacy (*q.v.*) was formed. It was not long before the allies consented to pay Athens a money-tribute instead of supplying their quota of ships, and it was only another step to transfer the headquarters of the league from Delos to Athens (454). Thus, almost imperceptibly, the allies became subject-States and the Athenian maritime empire came into being.

The Confederacy of Delos, under the able leadership of Cimon, son of Miltiades, waged active war against Persia in Asia Minor. At the battle of the Eurymedon (468) Cimon completely defeated the Persian army and fleet. As a result Carian, Lycian, and Pam-

phylian cities were enrolled in the Athenian federation. Further successes in the Hellespont and the coercion of unwilling members of the league completed Cimon's work in the Aegean. Cimon attempted also to conciliate Sparta by coming to her assistance unasked in the third Messenian War (462) but the Athenians disliked his pro Spartan policy and the Lacedaemonians themselves rebuffed him.

It was not long before the rivalry between Athens and Sparta broke out into war. The year 431 saw the beginning of the Peloponnesian War which lasted till 404 B.C. It was a struggle between a maritime and a land power and between a democracy and an oligarchy. In the end the oligarchic land power won. Soon after the outbreak of war Athens lost her greatest statesman Pericles, the only man who had ever been able to control the new Athenian democracy. After 429 Athens was at the mercy of demagogues like Cleon, incompetents like Nicias and adventurers like Alcibiades. Athens was crippled by the failure of her grandiose Sicilian Expedition (415-413) and Sparta, after the battle of Aegospotami (405), became the victor and resumed the hegemony of Greece. But instead of freeing the late members of the Athenian empire as she had promised, Sparta merely turned them from democracies into oligarchies. Her leadership was accordingly unpopular and short-lived. In 394 ten years after the surrender of Athens the Athenian Conon, in joint command of the Persian fleet, defeated the Spartan fleet at Cnidus, destroying the new maritime power of Sparta. The terms of the Peace of Antalcidas (or the King's Peace, 387) stipulating that all Asiatic cities belonged to Persia and that all Greek cities were to be autonomous were intended to secure the break up of existing Greek leagues and to prevent the revival of any that had collapsed. Thebes refused to dissolve the League and in

378 the Athenians revived the Delian Confederacy. Under the leadership of Epaminondas Thebes inflicted an humiliating defeat on Sparta at Leuctra in 371 and assumed the hegemony. Epaminondas now carried the war into the Peloponnese. Immediately N. of Spartan territory he placed a ring of fortified cities of which perhaps the most noteworthy was Megalopolis, the new federal capital of Arcadia, founded c. 369 B.C. Athens however now united with her former enemy and Epaminondas fell at Mantinea in 362 and with him the Theban supremacy came to an end after 9 years.

A new danger was now to arise in the N. Macedonia, though strictly a part of Greece was always regarded by the inhabitants of old Greece as a foreign country. Until the reign of Philip II it had not been prominent. Philip however, after consolidating his dependencies Paonia and Illyria, began to extend his kingdom. He took Amphipolis in 357 and Pydna and Potidaea in 356. The Sacred War of 356-346 gave him an opportunity to interfere in the affairs of Greece. The Phocians had seized Delphi in 356 and had become involved in a war instigated by Thebes with the Amphictyonic League. For a time the Phocians helped by Athens and Sparta and enriched by the treasures of Delphi became supreme in central Greece but they soon came to grips with Philip who drove them out of Thessaly. In 346 Philip concluded a one-sided peace with Athens and caused the disintegration of Phocis. The same year he presided at the Pythian Games at Delphi. Philip was naturally sympathetic to Athens but the fiery speeches of Demosthenes made reconciliation impossible. War broke out in 340. At the battle of Chaeroneia (338) Philip utterly defeated the allied Greeks and the last hope of independence vanished. Philip was now master of Greece.

He determined to set in motion his scheme for the conquest of Ionia, and

at the Congress of Corinth (also in 338) he was elected leader of the Greeks in the projected expedition. On his assassination in 336 his son, Alexander the Great, took his place. After crushing a revolt in Bœotia and destroying Thebes, Alexander set out on his great career of conquest and hellenisation in Asia Minor, Palestine, Egypt, Persia, and India. After Alexander's death (323) a feeble attempt at regaining Greek independence was crushed in the Lamian War (323-322). With regard to the rivalry of Alexander's successors (the Diadochi) it is sufficient here to say that Greece remained generally under Macedonian rule. The 3rd cent. B.C. saw the rise of the Achaean League (*qv*), under the leadership of Aratus, and its rivalry with the Ætolian League (*qv*). The unwise alliance of Philip V of Macedon with Carthage led to intervention by Rome and to Philip's defeat at Cynoscephalæ in 197 by the Roman general Flaminius. In 196, at the Isthmian Games, Flaminius declared the freedom of all Greek cities taken from Macedon. After the battle of Pydna (168) Rome lay Macedon under tribute. In 146 the Romans took and destroyed Corinth, broke up the Achaean League, and virtually extinguished the independent existence of Greece. They eventually created two Roman provinces out of the wreck of Greece, Macedonia in the N and Achaia in the S. Though Nero repeated in A.D. 67 that Greece was "free," the declaration was merely a tribute to her former greatness.

After the division of the empire following the foundation of Constantinople in 330 Greece became part of the Byzantine Empire (*qv*). In 395 the country was ravaged by Alaric and his Goths. In the early Middle Ages it suffered invasions by Slavs, Avars, Sicilian Normans, Catalans, and Venetians. After the capture of Constantinople in 1204 part of the disintegrated Byzantine Empire was reformed as the so-called Despotate of Epirus, while Boniface of Montferrat

became King of Thessalonica, delegating the government of Attica and Bœotia to Otho de la Roche. Various Frankish barons established feudal States in the Peloponnesus. After 1453 the Ottoman Turks conquered the country, holding it, in spite of temporary inroads by Venice, until 1821. In that year began the Greek War of Independence. In 1834 Athens became the capital of independent Greece. In 1863, after the deposition of Otho of Bavaria, the first King of Greece, Great Britain gave up the Ionian Islands, which she had protected since 1815, and Prince William of Denmark began to reign as George I. In 1881 Thessaly was incorporated. The effects of the disastrous war of 1897 with Turkey were neutralised by the Great Powers. In 1911, under the guidance of Venizelos, Greece became a member of the Balkan League. The Balkan Wars of 1912-13 gave Greece Macedonia, Epirus, Crete, and most of the Ægean islands.

In the World War Constantine, who had succeeded George I in 1913, favoured Germany, while Venizelos favoured the Allies. In 1917, after a provisional government had been set up at Salonika by Venizelos in 1916 and Greece had been virtually blockaded by the Allies, Constantine abdicated in favour of his second son Alexander, and Greece joined the Allies. The Treaties of Neuilly (1919) and Sèvres (1920) gave Greece a considerable increase of territory at the expense respectively of Bulgaria and of Turkey. Constantine returned to the throne in 1920 after the death of Alexander. After the disastrous campaign of 1921-2 in Anatolia Constantine abdicated again, this time in favour of his eldest son George. The Treaty of Lausanne (1923) restored much territory to Turkey and gave the Dodecanese (*qv*) to Italy. In 1924 a republic was declared. The constitution was upset in 1925-6 by the temporary dictatorship of General Pangalos.

See the Cambridge Ancient History.

J B Bury *History of Greece* and the *Histories* of Herodotus Thucydides and Xenophon

Greek Independence War of (1821-3) the war by which Greece then a part of the Turkish Empire obtained her independence. The 19th cent saw a revival of nationalism amongst the Greeks at first cultural and then in 1815 in the foundation of a revolutionary society the *Hetaeria*. In March 1821 Prince Alexander Ypsilanti President of the Society invaded the Danubian principalities from Russia but that country disavowed the revolt and it soon collapsed. In April led by Archbishop Germanos the Greeks in the Morea and shortly afterwards the Greeks in the Aegean Islands launched a revolt. In the first period they were successful. They obtained command of the sea won skirmishes and massacred many Turks. The Turks retaliated by massacring Christians in Constantinople including the patriarch. In 1822 the Sultan made a determined effort to defeat the Greeks but the Turkish army was destroyed in the pass of Derwenaki by the Greeks under Kolokotronis. Civil war in Greece in 1823 gave the Turks an opportunity which however was lost through the famous surprise attack on them by Marko Botzaris. Civil war in 1824 and the expedition of Mehemet Ali Pasha of Egypt with ships and trained soldiers changed the course of the war. In spite of aid from Phil Hellenes such as Byron Lord Cochrane and Sir Richard Church the Greeks were defeated on land and sea.

But Europe had been aroused to enthusiasm for the Greek cause. The Powers intervened a demonstration of French and English fleets led to the Battle of Navarino (qv) and the destruction of the Egyptian fleet. Russia intervened in the N in 1829 and the war ended. By the Treaty of Adrianople (1830) Greece was declared an independent State. The Great Powers reduced its boundaries in 1830 and it was not until 1832 that the Convention of London guaranteed the independent monarchy of Greece under

the protection of Great Britain France and Russia. Otto son of the King of Bavaria was chosen King.

Greek Language The various dialects of ancient Greek and the modern tongue which descends from them together form one of the most important branches of the Indo-European (qv) family of languages. The area over which it has been spoken has varied with the expansion and contraction of the spheres of Greek political influence. In the days of the Athenian Empire and of the conquests of Alexander the Great the language was very widely spread but modern Greek is little spoken outside Greece itself. It is clear that in any account of the language there must be a sharp distinction between ancient and modern Greek for not only are there great actual differences between the two but also they differ widely in relative importance.

Ancient Greek was divided into four main dialects Aëolic Arcadian or Cyprian Doric and Ionic but as nearly the whole of ancient Greek literature and of the material which provides us with our knowledge of the language has reached us in the Attic sub-dialect of Ionic it is with the Greek of Attica the district in which Athens stands that we are almost exclusively concerned. The Greek letters were developed from a Semitic original the Greek alphabet almost certainly had considerable influence upon the similar development of the Latin alphabet and it is the direct parent of the Russian and Serbian alphabets (see ALPHABET). Close inspection of a Greek text reveals the fact that practically every word is distinguished by an accent placed over one of its syllables. Though these accents were not generally written before the 9th cent AD they are of the greatest interest and importance in the study not only of Greek but of Indo-European linguistics generally. Excluding the *barytone* which is not a true accent at all there were two of these accents the *oxytone* (') and the

perispomenon (◌) They differ entirely in ancient Greek from the Teutonic (and modern English) accent, which is one of *stress*, for they were *pitch* accents. The oxytone indicated a high tone, and the perispomenon a falling tone of voice, but they bore no relation to the length of a syllable or to the vigour expended in its pronunciation. They were carefully and accurately preserved by oral tradition until in the 9th cent. the Byzantine scholars deemed it expedient to record them more permanently in writing. Their linguistic importance lies in the fact that, by a comparison of them with the accent of Sanskrit, it is possible to arrive at a fairly accurate estimate of the original Indo-European accent, and so to trace the effects of that accent in the development of the sound changes which characterise various of the Indo-European languages (see for example, VERNER'S LAW).

The grammatical structure, out of which was developed one of the greatest literary languages that the world has known, was of considerable inflexional complexity. In addition to many features which were equally preserved in the Latin language (*qv*), Greek had, as well as a singular and a plural, a dual number (though this was practically obsolete even in classical Greek), and a middle voice as well as the active and passive. The verb had a very complicated conjugation, and hence was capable of expressing very many shades of meaning, and it is mainly due to this fact and to one other that Greek became such a flexible medium of literary expression. The other reason for this was one which is found in no comparable degree in any other Indo-European language except Russian, namely, the extraordinary number of *enclitics* or syllables of *nuance*, which are frequently untranslatable into, for example, English, but are capable of altering the whole tone and meaning of a sentence.

Apart from its very great intrinsic beauty, Greek is of the first importance in respect of its influences upon other

languages. In the first place, through its literature and its general culture it profoundly affected Latin, which in turn is one of the most influential of all the Indo-European languages. Furthermore, Greek has provided a happy hunting-ground for the word-borrowers of nearly every Western tongue when the need has arisen to coin a new word. This is especially true of the terminology of the various sciences.

In *Modern Greek* a distinction must be made between the "pure" and the "popular" forms of the language. The former is largely artificial, and is the result of a conscious effort to return as far as possible to ancient Greek. It is the official and editorial language. "Popular" Greek is the form in which the language has naturally developed in accordance with the history of its speakers. Both forms, but especially the "popular," have incorporated many foreign words into their vocabularies, and these, as is natural, have been taken from the nations with which Greece has been brought into the closest political contact. Hence by far the largest foreign element in modern Greek is Turkish. Apart from its vocabulary the chief differences from ancient Greek are as follows. The old pitch accent has been replaced by a stress accent. Many of the vowel sounds have been assimilated into one (there are at least 6 different vowels or combinations of vowels which are all pronounced *ε*), and there are various other phonetic peculiarities affecting the consonants. Many of the old grammatical inflexions have dropped out, especially in the "popular" speech.

Greek Literature, besides forming one of the great branches of classical literature (*qv*), includes also the whole of the literature written in Greek during mediæval and modern times. The line of demarcation between the classical and the mediæval (or Byzantine) periods is not easy to define, but it may conveniently be placed in the early 6th cent. A.D., the date dividing the Byzantine from the modern period.

can definitely be taken as 1453 when the Eastern empire fell.

For reasons too complex to be discussed here the Greek language did not as Latin did become the parent of a family of languages each with its own literature. One reason for this was that the ancient language was and is held in such veneration that it has actually competed with the progressive development of a literary language which is at the same time in tune with the spirit and circumstances of the times through which it has passed. The result has been that although the spoken language has continuously changed there has remained also an official language relatively close to that of the classical period.

Byzantine literature however is not a mere imitative continuation of classical Greek literature. It is the reflection of the influences and tendencies of its own times and the most outstanding of these influences was the Christian religion. Some of the greatest Greek theologians had however appeared in the 4th cent. and these include Eusebius, Gregory of Nazianzus, Gregory of Nyssa, Basil the Great and St. Chrysostom. These and their successors in later centuries were inspired by the need to combat the various great heresies which shook the Church. In the 8th cent. a formidable antagonist John of Damascus powerfully stated the principles of Christian dogma to combat the Iconoclasts in his *The Fountain of Knowledge*. During the Byzantine period there appeared also many *Lives of the Saints* of which *Laalam and Josephus* (qv) is the most widely known example.

The poetry of this period again was dominated by Christianity. The 6th cent. was the golden age of the Greek hymnographers and in the 7th and 8th cents was developed a new kind of religious poetry the *Canons* a highly complex lyrical form of which John of Damascus was one of the great masters. While the actual language of poetry remained close to that of Attic Greek its form was

changed completely for the old quantitative metre gave way to one of stress accent. The Byzantine period also produced a great quantity of secular poetry, nearly all narrative or didactic or political or epigrammatic but hardly any of it purely lyrical. Throughout the period there was an almost continuous succession of historians. Two great contributions to literary history and criticism were the *Library or Myriobiblon* of Photius in the 9th cent. and the *Lexikon* of Suidas in the 10th cent.

All the above literature important and influential as it is was largely artificial. But there existed also a far more vital literature in the purely vernacular tongue the bulk of it being in poetic form. This is comprised of epics and romances and erotic poems and fables which taken in the mass form a very living and interesting if little known literature which is the natural link between that of classical Greece and the popular modern literature.

After the fall of Constantinople in 1453 Greek scholars were dispersed throughout the West and these and their successors continued to produce works written in imitation of classical Greek, mainly of a theological character but also covering other fields of science and scholarship. Many of these had considerable influence upon the ultimate revival of Greek nationalism particularly by the editions of the classics and the contributions towards language reform of Adamantios Korais (1748-1833). In the 19th cent. the outstanding classical author was Alexandros Rizos Rhangabes (1810-189) who was prolific in nearly every branch of literature.

But the literature of the spoken or vernacular language became during the modern period increasingly paramount especially in poetry. In the 16th and 17th cent. there was a remarkable Cretan literature while the island was under the rule of Venice including the tragedy *Eophrosyne* of Georgios Horiatis the romantic

poem *Erotokritos* of Vincenzo Cornaro, and the pastoral poem, *The Fair Shepherdess*, published by Nikolaos Drymitinos. In the *Ægean Islands* there was a wealth of popular songs and ballads, emanating chiefly from the *Idlepts* who, in their mountain retreats, continued to defy the Turks. But the man who did most to ensure the supremacy of the vernacular as the language of poetry was Dionysios Solomos (1798-1857), whose best-known poems are *Lambros* and the *Ode to Liberty*. The way to the use of popular Greek for imaginative prose was indicated by Joannes Psuchares (b. 1854) in *My Journey* (1888).

The 20th cent. has seen the demotic, or vernacular, language attain an unassailable position as the medium of Greek literature, especially of poetry. The "pure" language is recognised as the official language, but the other holds the field for all imaginative and creative work. Possibly the greatest name of the century is Kostas Palamas, poet, novelist, and critic, whose poem, *The Immutable Life*, places him among the foremost of modern poets. He has been followed by a number of poets, ranging from the smoothly melodious to the boldest experimenters in modern forms. The output of prose literature also has been very large, and it is only lack of space that confines present reference to the stories of Papadiamandis, and to the novels and plays of G. Xenopoulos.

Much of modern Greek poetry has been translated into English, but a comprehensive English survey of the whole of Byzantine and modern Greek literature does not appear to exist.

Greeley, Horace (1811-1872), American journalist and politician. He published the first cheap paper in New York, the *Morning Post*, which failed almost immediately. After various journalistic activities, he published *The New Yorker*, *The Jeffersonian*, and *The Log Cabin*, and finally *The Tribune*, a daily paper, in which he wielded great influence in political questions. He opposed Grant in his

election for a second term of office as President, but was defeated. This was in 1872. He did not long survive the defeat, and died in the same year.

Green, John Richard (1837-1883), English historian, succeeded Stubbs as librarian at Lambeth Palace (1869). His *Short History of the English People* appeared in 1874, his vivid and picturesque style made it immediately popular. *The History of the English People* (4 vols, 1878-80), *The Making of England* (1882), and *The Conquest of England* (1883) form more serious contributions to historical knowledge.

Greene, Robert (1560-1603), English dramatist and pamphleteer, was one of the "University Wits" (qv). His life was one of vice and poverty, yet his poems have much charm and grace. His dramatic work, for which he is best known, includes *Orlando Furioso* (1594), *Friar Bacon and Friar Bungay* (1594), and *Pandosto* (1588). His pamphlet, *Greens Groats-worth of Wit, bought with a Million of Repentance* (1596), contains the famous reference to Shakespeare—"an vpstart Crow, beautified with our feathers, that with his Tygers heart wrapt in a players hide supposes he is as well able to bumbast out a blanke verse as the best of you and . . . is in his owne conceit the onely Shake-scene in a countrie." But, if Shakespeare borrowed from Greene, Greene also borrowed from other writers, his *Pandosto*, for example, was based on an earlier Polish romance.

Green-Fly, *Plant-lice*, or *Aphides* (see *APHIDS*), insects of the family *Aphididae* belonging to that division of the Hemiptera (qv) in which the similar transparent wings, when depressed, slope over the sides of the body. Green-fly, of which there are many different kinds, by no means always green, feed upon various plants, and on account of their extraordinary fertility are perhaps the most troublesome of all insect-pests to farmers, fruit-growers, and horticulturists. Their life-history, varying according to

the species is typically complicated. From eggs laid in the autumn are hatched in the following spring wingless females which parthenogenetically (see EMBRYOLOGY) produce living female young mostly similar to the parents although a few winged specimens may be in the brood. Throughout the summer this process of reproduction goes on for several generations winged females becoming more numerous and sometimes amounting to vast swarms which take wing in search of fresh plants to feed upon. Later in the year both the winged and wingless females produce winged sexually mature males and females which pair the females subsequently laying the eggs destined to hatch in the spring. Although the fecundity varies according to the favourableness of the season it is certain that a single individual hatched in the spring may be the source throughout the season of thousands perhaps millions of green fly. If all survived there would soon be no plants left for them to feed upon but heavy rains destroy thousands and many insects such as the larvae of hover flies, ladybirds and others and insectivorous birds like tits feed on them and help to keep their numbers down. It is obviously to the interest of plant growers to know the natural enemies of these pests and refrain from interfering with them.

Greengage, a green or golden plum (qv).

Greenland, a large island chiefly within the Arctic Circle bounded on the W by Baffin Bay and Davis Strait and E by the N Atlantic area c. 830 000 sq m. The coast line is jagged and indented with bays and fjords. Much of its surface is ice bound and parts of the extreme NE and NW coasts have not yet been explored. There are mountains enormous glaciers, and small running streams of melted snow and ice. The chief trade is in whale and seal oil animal skins eiderdown and cryolite. The cod and haddock fisheries of

which the Danish Government holds a monopoly are mainly found on the W side. There is very little vegetation and less cultivable land. Bears, wolves, reindeer, foxes and birds in large numbers are found here.

The history of its exploration dates from the visit of Martin Frobisher in 1576 to the Greenland Survey Expedition of 1933. The attempt of Whymper and Brown in 1867 to penetrate the interior was followed (1880) by the success of Peary and Majaard and 2 years later by Nansen who succeeded in reaching a height of 8927 ft and crossing an extensive field of inland ice. In 1912 Rasmussen and Freuchen crossed and re-crossed the area from the Gulf of Inglefeld to the Danmark fjord. Although Greenland has been governed by Denmark since 1814 her supremacy was challenged by Norway who occupied a part of E Greenland in 1930 but the Hague Court has awarded the disputed territory to Denmark. Pop. mainly Eskimo (1930) 16 630.

Green Mud, see OCEANS AND SEAS.

Greenock, port and industrial town Renfrewshire Scotland. Apart from its shipbuilding and shipping there are sugar and oil refineries and large ropewalks. Harland & Wolff has an important shipyard at Greenock. In the cemetery is buried Burns's Highland Mary. Pop. (1931) 18 948.

Green Oil, the name sometimes given to the fraction of coal tar (qv) which distils at 20-400 C. Also known as anthracene oil.

Greensand, any sand or sandstone to which glauconite (qv) imparts a greenish colour. The glauconite is probably deposited as casts of the shells of Foraminifera and other organisms. The most notable deposits of this nature are the Lower and Upper Greensand of the Cretaceous system (qv). The Cambridge Greensand is a band containing phosphatised fossils some of Mediterranean type and phosphatic nodules occurring at the top of the Lower Cretaceous.

About one-third of the fossils have not been found elsewhere in England

Greenshank, a bird of the plover family, one of the largest species of the sandpipers, about the size of a woodcock, but with a long bill, neck, and legs. It breeds in the N parts of the Old World, even in the Scottish Highlands, but in winter goes as far S as the Cape and Australia

Greenwich, metropolitan borough on the Thames. There are cable, engineering, linoleum, and chemical works, and a power-station. Fronting the river stands Greenwich Hospital, occupying the site of the former royal palace known as Greenwich House, in which Henry VIII and his daughters Queen Mary and Queen Elizabeth were born, here also his son Edward VI died. The palace was pulled down by Charles II, who built Greenwich Hospital in its place. The W wing was designed by Inigo Jones, other parts were completed by Sir Christopher Wren. The new building, containing the famous "Painted Hall," at first a hospital for seamen, became a Royal Naval College in 1873. In 1932 the hospital school was removed to Holbrook, Suffolk. Greenwich Observatory, in Greenwich Park, was built in 1675, its clock is the standard (Greenwich mean time) for the whole country. The meridian of Greenwich is the datum of longitude for all British and most foreign geographers. The annual "whitebait dinner" of cabinet ministers is no longer held. The population of the borough is 100,900.

Greenwood, Frederick (1830-1909), English journalist, Editor of the *Cornhill* (1864-8), *Pall Mall Gazette*, *St James's Gazette*. Through Greenwood the purchase by Disraeli of a large proportion of the shares in the Suez Canal was brought about. He had considerable influence on the thought of his time. He published several books, including *Imagination in Dreams* (1894).

Greet, Sir Philip Ben (b 1857), English actor-manager, first appeared on the stage, 1879, at Southamp-

ton; began management in 1886, producing Shakespearean performances in the open air. Revived *Everyman* in 1902. Has toured Great Britain and U.S.A. with repertory companies, in which many famous actors have received their training. Knighted, 1929.

Grégoire, Henri (1750-1831), French politician and ecclesiastic, born near Lunéville. He became a prominent revolutionary bishop, and was chosen as President of the National Convention in 1792 but retained his episcopal office, and recommended the reopening of the churches. On the conclusion of the Concordat with Rome (1801) he was compelled to retire, and until his death devoted himself to literary works on religious and political subjects.

Gregorian Calendar, see CALENDAR

Gregory of Nazianzus, St. (328-389), a father of the Eastern Church, and one of the most important of Eastern theologians. He was a leader of the Orthodox party against the Arians, and largely followed Athanasius and Origen in his writings. He was appointed Metropolitan of Constantinople in 380, but resigned soon afterwards, retiring to his birthplace, Nazianzus, in Cappadocia.

Gregory of Nyssa, St. (c 330-c 400), a father of the Eastern Church and Bishop of Nyssa in Cappadocia. He took a leading part in the struggle against the Arians, for which he was exiled by the Arian Emperor Valens.

Gregory, name of 16 popes, one of the greatest of whom was GREGORY I (530-604), who sent Augustine to spread the Christian faith in Britain, and collected and preserved the plainsong (qv) chants still the official music of the Roman Catholic church. GREGORY II (715-731) was responsible for the propagation of Christianity in Germany by sending St Boniface there. GREGORY VII (Hildebrand), pope from 1073-85 instituted reforms within the church which brought about a sentence of deposition from the Emperor Henry IV in 1076, to which the Pope replied by excommunicating

the Emperor Three years later the young German king again deposed Gregory This time the Pope's supporters deserted him and he fled from Rome while Archbishop Gualbert of Ravenna took his place as Clement III GREGORY IX pope from 1227-41 twice excommunicated Frederick II and established the system by which the Inquisition was to be operated GREGORY X pope from 1271-8 brought about a temporary union with the Greek Church on the occasion of the General Council at Lyons (1274) and laid down regulations for papal elections GREGORY XIII pope from 1572-83 extended the activities of the Jesuits encouraged the Irish in their hostility towards the English and Philip II in his attacks on the Netherlands He also reformed the Calendar (qv) GREGORY XIV pope from 1590-1 is chiefly notable for having excommunicated Henry of Navarre

Gregory Isabella Augusta, Lady (185-193) Irish playwright and director with W B Yeats of the Abbey Theatre the home of Irish national drama Her publications include volumes of plays collections of Irish folk legends and myths and *Our Irish Theatre* (1914) a history of the Abbey

Gregory John Walter (1864-1932) distinguished English geologist He began his scientific career in 1897 as palaeontologist in the Natural History Museum In 1901 he accepted a similar professorship at Glasgow from which he retired in 1929 He undertook many expeditions to various parts of the world including E Africa where he studied the Great Rift Valley Spitzbergen the Rockies the Himalayas and finally to the Andes where he was drowned by the upsetting of a canoe His geological studies centred rather in great earth movements than in minor stratigraphy and he was also profoundly interested in racial and sociological problems

Greisen, a granite modified by the felspar and consisting essentially of quartz and white mica

though in Cornwall topaz and tourmaline may also be present The mica gives the rock a glittering appearance in hand specimens Greisens occur in veins in the granite and have presumably been formed by hot vapours or liquids rising through the fissure Schorl is a variety of greisen in which tourmaline is present instead of or as well as white mica It is formed in the same way Both greisen and schorl may contain ores of tin

Grenada, a British possession in the Windward Islands Caribbean Sea Cocoa sugar cotton and spices are the main products and exports Administration is carried on by a Legislative Council presided over by the Governor Education is Government aided and there are 60 schools Area 131 sq m pop (1931) 864

Grenade, a hot iron ball filled with explosives and fired by a light fuse (unpowder filled grenades of wood were invented in the 16th cent and in the 17th special bands of grenadiers were formed for their use Modern hand grenades were successfully used by the Japanese against Russia in 1904 and various forms many made from old tins etc were introduced at the outbreak of the World War These first grenades exploded on impact, but the Mills bomb of which huge numbers were made depended for its firing upon the freeing of a lever after throwing See also Bombs

Grenadier a soldier whose original duty was to throw grenades (qv), usually chosen for his height and strength The grenadier companies had a priority of others and marched on the right of the line from which first after their disbandment in 1859 the first company of a battalion often assumed the name

Grenadier Guards the first regiment of the British Army by rank though not by age In 1689 a royal regiment of guards raised as a bodyguard for Charles II in 1680 was amalgamated with Lord Wentworth's Regiment (1656) the whole being called The

First or Grenadier Regiment of Foot Guards. They fought with Marlborough, with Wellington, in the Crimea and S Africa. They were among the first British troops in France in 1914, took part in the retreat from Mons, and in every important action on the Western Front during the World War

Grenadin, *see* FILLETS

Grenfell, Julian Henry Francis (1888-1915), English poet, son of 1st Baron Desborough, killed in the World War. His poems, which include *Into Battle*, *To a Black Greyhound*, and *The Hills*, show a remarkable love of Nature

Grenfell, Sir Wilfred Thomason (b 1865), British medical missionary. He studied medicine and became house surgeon under Sir Frederick Treves at London Hospital. He fitted out the first hospital ship for the North Sea fisheries, making many cruises with the fishermen, and establishing homes and missions on land for their use. In 1892 he built 5 hospitals, as well as nursing stations, orphanages, and schools in Labrador, and still cruises annually along that coast in his hospital steamer *Strathcona II*. In 1915 he was made an honorary Fellow of the American College of Surgeons, and served in France during the World War in the Harvard surgical unit. His *Autobiography of a Labrador Doctor* (1919) describes his missionary work among the fishermen.

Grenoble, fortified city, S E France, in the Isère department, once the capital of the Dauphiné. The cathedral and the church of St Laurent date in part from the 11th cent. Secular buildings include Palais de Justice (c 1480), the university, and the town library. The town is famous for its kid gloves. Pop 86,621.

Grenville, George (1712-1770), English statesman. He entered Parliament in 1741, became Secretary of State in 1762, and later in the same year First Lord of the Admiralty. In 1763 he became Prime Minister and Chancellor of the Exchequer. It was during his term of office that the

American Stamp Act, which was to sever relations between the American colony and England, was passed.

Grenville, Sir Richard (c 1541-1591), an English seaman, born of an old Cornish seafaring family. He commanded his cousin's (Raleigh's) expedition to Virginia in 1585-6, and helped to settle Roanoke Island. He organised the defence of W England against the Armada, and fought a lone fight against the Spaniards with the *Revenge* off Flores in the Azores in 1591, being separated from his commander, Howard, and the rest of the fleet. After a fifteen-hour struggle, the *Revenge* was captured, and Grenville died from wounds on the Spanish vessel, *San Pablo*.

Grenville, William Wyndham, Baron (1759-1834), English statesman, son of George Grenville. He entered Parliament in 1782, became Speaker of the House of Commons in 1789 and later in the same year Home Secretary. In 1791 he became Foreign Secretary. He resigned, together with Pitt, in 1801, over the Catholic Emancipation Bill, and in 1807 resigned again over the same question, after he had headed a Coalition Government. Although he never again held office, he continued to support the Roman Catholics' cause. In 1790 he was raised to the peerage as Baron Grenville.

Gresham, Sir Thomas (1519?-1570), English merchant, educated at Cambridge. He entered the Mercers' Company in 1543, and went to the Low Countries as King's representative. In this capacity he influenced the exchange rate, and succeeded in raising the value of the pound. On his return to England, as financial adviser to Queen Elizabeth, he suggested the restoration of standard coinage. He founded the Royal Exchange, which he built in 1566-71, on the model of that in Antwerp. He endowed a college with 7 lectureships, which after his death was held in his own house in Bishopsgate. *See also* GRESHAM'S LAW.

Gresham's Law, the tendency for "bad" money to drive "good"

Gresham's Law

money out of circulation derives its name from Sir Thomas Gresham a Finance Minister of the reign of Queen Elizabeth.

Before the modern system of minting coins was perfected it was possible to scrape away their edges and chip or sweat off small portions. The dust thus obtained from many coins could be collected melted into pieces of gold or silver and sold while the sweated coins could be passed on at their face value in payment of debts or for the purchase of goods and services. Any person clever enough to detect sweated coins when they came into his possession would naturally pass them on, while he would tend to put away amongst his savings full weight coins using them to pay foreign debts where their weight was the criterion of their value or melting them into bullion for the same purpose. Thus bad coins would be kept in circulation tending to drive out of circulation good coins.

There are other types of "bad money." In debased coinage the amount of alloy has been increased and the amount of gold or silver lessened. Medieval monarchs habitually debased their coinage as it offered them an easy profit. A community accustomed to a coinage with the stamp of value of the Government or king on it as worth a certain amount would continue to use coins of the same size and practically the same weight at their face value. When it became debased the new coins of less intrinsic value would be bad money, driving the older coins at greater intrinsic value out of circulation. Watchful and clever bullion merchants were always ready to melt down good coins in order to sell the gold and silver abroad. Paper money which cannot be converted into coin, may also be bad money if it is issued in excess of the requirements of the community for a medium of exchange.

Gresham operates in a big case where the metallic

ratio between gold and silver arbitrarily adopted by the Government ceases to be the true ratio between the market prices of the two metals. The overvalued metal will then drive the undervalued metal out of circulation. See also BRISTOLISM.

Gretna, village Dumfriesshire, Scotland, notorious for irregular marriages. The Fleet marriages having been declared illegal in 1754 runaway lovers travelled to Scotland and a celebrated Fleet parson advertised his removal to Gretna. He was succeeded by an old soldier named Gordon, who in his turn was followed by Joseph Paisley called 'the blacksmith' originally a weaver and at one time a tobacconist. He died in 1814. In 1836 a Scots law



was passed requiring one of the two parties to qualify by a residence of at least three weeks before the marriage and Gretna Green marriages became rare thereafter although there are still a willing blacksmith, an anvil and a smithy.

Grétry, André Ernest Modeste (1741-1813) musical composer. He became a church chorister when a boy. His youthful compositions were responsible for his being sent to study at Rome where in spite of his acid misanthropy he achieved practical success with the production of his operas. On the conclusion of his studies Grétry went to Paris, where he produced a series of highly popular operas. Besides his operas, he composed a number of other works. He died in Paris in 1813.

and operettas, Grétry composed some graceful and highly melodious orchestral works which are sometimes heard to-day

Grenze, Jean Baptiste (1725-1805), a French painter, was born at Tournus in Burgundy, and worked at first at Lyons and later in Paris under a painter named Grondon. His paintings of young girls, often fondling a bird or a lamb, were very popular, and engravings from them are often seen. These invariably express an incredible degree of softness and innocence and pretty insipidity. He died in poverty. There are four of his works in the National Gallery and over 20 in the Wallace Collection.

Greville, Charles Cavendish Fulke (1794-1865), English diarist, whose *Memoirs*, covering the years 1820-60, were published from 1875 to 1887. As Secretary to Earl Bathurst, Secretary for Jamaica, and Clerk of the Council, he had unrivalled opportunities for noting the politics and personalities of the early 19th century.

Grévy, François Paul Jules (1807-1891), President of the French Republic, 1879-87. He studied law and, after the revolution of 1848, was elected deputy in the constituent assembly by the republicans of his department. He opposed the second empire under Louis Napoleon and returned to the Bar until 1868, when he was elected deputy for the Jura. He was several times President of the National Assembly from 1871 to 1879, and in the latter year became President of the republic. His term of office was marked by no distinction, and his peace with China in 1885 was inconclusive, but he was re-elected in 1895 for 7 years. Damage to his reputation through his son-in-law's (Daniel Wilson) traffic in honours, though undeserved, led to his resignation.

Grey, Charles Grey, 2nd Earl (1764-1845), English statesman, was born at Fallodon, Northumberland. He entered Parliament as member for Northumberland in 1786 and came into prominence as an assailant of the

Pitt policy. In 1806 he became First Lord of the Admiralty and later Foreign Secretary under Grenville, but resigned (1807) over the Catholic Emancipation question. In 1820 he opposed the Caroline Divorce Bill, knowing that such action would earn him royal disfavour. In William IV's reign, however, he became Prime Minister of the Whig administration (1831), and introduced the Reform Bill. His resignation followed a disagreement in the cabinet on the Irish question.

Grey of Fallodon, Edward Grey, 1st Viscount (1862-1933), entered Parliament as a Liberal, and from 1892 to 1895 was Under-Secretary for Foreign Affairs, in which position his integrity and ability made a marked impression. In 1905 he became Secretary of State for Foreign Affairs, retaining his office during the momentous years up to 1916. During this period negotiations were conducted with France as to the nature of Britain's support in the event of war with Germany, and the Anglo-Russian agreement sealed Grey's subsequent policy towards Germany met with the approval of the country and in 1912 he was appointed to the Order of the Garter, an exceptional honour for anyone below the rank of marquess. His obvious sincerity and diplomatic skill made him an impressive spokesman of the country's policy during the early days of the World War. In 1916 failing eyesight and Asquith's resignation both influenced him in giving up office, when he was created Viscount. In later years he interested himself in the League of Nations, and in 1919 went to the United States for 3 months on a diplomatic mission. He wrote *Twenty-five Years, 1892-1916, Fallodon Papers*, and the *Charm of Birds*. He died in September 1933.

Grey, Sir George (1812-1898), British administrator. He was born at Lisbon, and entered the Army in 1829, retiring in 1837 with the rank of captain. He then explored the N.W. of Australia for the Royal Geographical Society. He was Governor of S

Australia from 1841 to 1843 of New Zealand 1845-53 and 1861-7 and of Cape Colony 1853-60. As Governor of New Zealand he became very popular with the Maoris who had been in rebellion. He entered the New Zealand Legislature in 1844 becoming Premier in 1847. He was responsible for many useful reforms before his retirement in 1884. He was knighted in 1848 and became a Privy Councillor in his later years in England.

Grey Henry Grey 3rd Earl (1801-1894), son of Charles Grey 2nd Earl Grey (qv). He was Under Secretary for the Colonies from 1830 to 1833 during his father's ministry. From 1835 to 1839 he was War Secretary in Lord Melbourne's Cabinet. He was an ardent advocate of slave emancipation and colonial reform and while Colonial Secretary (1846-54) instituted many important changes in the trade relationships between Great Britain and her colonies. In 1848 he founded the ticket-of-leave system and favoured transportation of convicts.

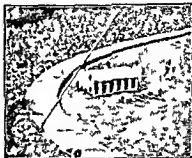
Grey Lady Jane (1133-1154) daughter of Henry Grey Duke of Suffolk and a great-granddaughter of Henry VII. According to her tutor Roger Ascham at an early age she wrote excellent Latin. In 1153 she married Lord Guildford Dudley son of the Duke of Northumberland and the latter prevailed upon Edward VI to settle the crown upon her. When the King died she refused the throne but at length yielded to the entreaties of both her husband and her father. This glory was but short lived. After only 10 days the populace declared in favour of Mary and Lady Jane and her husband were imprisoned in the Tower of London and after a few months were executed.

Grey Zane (b 1875) American author has published since 1904 many popular novels dealing with ranch life in the W States. He has made motion pictures of big game fishing in which he is keenly interested.

Greyhound, one of the oldest breeds of sporting dogs as attested by Egyptian and Babylonian monuments which

depict a dog obviously used for hunting, fleet footed game and differing from the modern type merely in having the ears pricked. Greyhounds hunt by sight not by scent like true hounds (see Dogs) and until recently were used in England exclusively for coursing hares. Within the last decade their qualities have been popularly exploited for greyhound racing (qv) on prepared tracks.

Greyhound racing in which greyhounds pursue a mechanically propelled artificial hare was first tried in England c 1840 but received no support. It was reintroduced from the



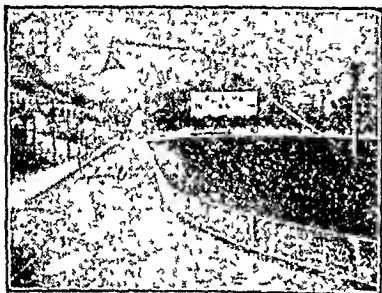
The First Race

USA in 1901 by a private company and the first track was opened at Manchester.

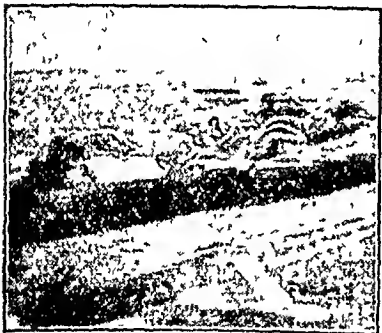
Its success led to the formation of other companies and tracks were opened all over the country.

The *National Greyhound Racing Association* was formed in 1908 for the purpose of controlling the sport. Greyhound racing takes place usually in the evening in oval arenas surrounded by tiers of stands for spectators. During races the track alone is brilliantly illuminated. The dummy hare controlled by an official from a specially constructed tower runs on the outside of the track and is never caught except by accident, the object being merely to test the pace of the dogs for betting purposes. Six dogs usually take part in each race. They

are muzzled, and each wears a numbered coat. They are released simultaneously by raising the front of the starting-box, in which they have been confined in separate compartments. Races are usually over 500 or 525 yds., either on the flat or over hurdles. The



The Straight



Taking a Hurdle

largest London tracks are at Wembley and the White City.

Greywacke, a rock composed of an aggregate of grains of quartz, felspar, and other minerals united by a cement, usually siliceous, but more rarely calcareous, felspathic, or clayey. In colour greywackes vary from grey to brown or purplish, even to black when anthracite is present. They are usually hard tough rocks, and preponderate in the Palaeozoic era, being regarded as the sand, mixed with other impurities, from the sea-floor of that epoch. They grade into greywacke-sandstones

and greywacke-slates. Sometimes they metamorphose into schists and gneisses. Typical greywackes occur in S. Scotland, the Lake District, and Wales.

Grid System, see ELECTRICAL TRANSMISSION OF POWER, ELECTRIFICATION.

Grieg, Edvard Hagerup (1843-1907), Norwegian composer. As a youth he showed such great musical talent that the famous Norwegian violinist, Ole Bull, suggested that he be sent to the Leipzig Conservatoire. There he studied under Richter and Moscheles and, on his return to Norway, under Niels Gade. He was famous in his lifetime as a pianist, first appearing in London in that capacity in 1888. Grieg's compositions have in them something of the beauty and ruggedness of his native Norwegian scenery, and contain a wealth of melody. His most popular works are the *Peer Gynt* suites, his *Piano Concerto in A Minor* (one of the most popular of all works in this form) and his fine *Sonata in C Minor* for violin and piano. He also wrote many charming songs. In his uneven *Lyric Pieces* for the piano are to be found some of the best of his smaller compositions.

Grierson, Sir James Moncrieff (1859-1911), British general, born at Glasgow. He joined the Royal Artillery in 1877, and was military attaché in Berlin, 1896-1900. He fought in the S. African War under Lord Roberts, and under Count Waldersee against the Boxers in China. He was at Aldershot, 1906-10, and given charge of the E. Command in 1912. He went to France with the II Army Corps at the outbreak of war, but died suddenly on Aug. 17, 1914.

Griffin, (or *Gryphon*), a mythological monster, sacred to the sun, combining the structure of an eagle with that of a lion. Nemesis, the avenger of human crimes, rides in a chariot drawn by griffins. A gold griffin c. 2 m. long was discovered at Mycenae, and in Burma, some 250 m. up the R. Irrawaddy from Rangoon, are two colossal griffins guarding the road up to a temple.

of Buddha. The wingless or male griffin has horns and spikes proceeding from its body. The hippogriff



mole
wingless



Burmese
colossal

GRIFFIN

and amoorgh are also forms of the griffin.

Griffith, Arthur (18 10) Irish statesman, became member of the Fenian Society and founded the *United Irishman* in 1899 which expressed a more intellectual nationalism and introduced a cultural element new in Irish political propaganda. He advocated a non aggressive policy of resistance involving non payment of taxes, the absence of M.P.s from Parliament and the establishment of local tribunals in which policy the later Sinn Féin movement had its origin. He was prominent in the organisation of the Irish Volunteers just before the outbreak of war but was not involved in the 1916 rebellion. From 1918 to 1921 after the Sinn Féin success at the election Griffith's policy outlined years before was put into force while Collins's men and the Black and Tans were carrying on the guerrilla war. He preceded the decision to

preceded the
treaty with

Great Britain. Griffith was elected as the first President of the Executive of the Irish Free State in 1921 when de Valera refused to agree to the treaty.

Griffon, continental name for several rough-coated breeds of sporting dogs generally applied with the suffix

Bruxellois to a rough-coated snub-nosed toy-dog fashionable a few years ago which as shown by Dutch paintings of the 15th century was derived from a small terrier somewhat of the Aberdeen type.

Grignard Reaction, the name given after the discoverer to a series of organic chemical reactions that occur in an ethereal solution between magnesium and the halides (halogen compounds) of alkyl (aliphatic) or aryl (aromatic) radicals. The presence of ether or of another organic solvent such as benzene or toluene is necessary since the solvent plays the part of a catalyst. Ether is by far the most effective. The Grignard reaction is of extreme importance in synthetic organic chemistry since by its aid it is possible to prepare a large number of compounds by convenient methods.

Grilling, a method of cooking by which the food is exposed to the direct rays of heat. It is often used for thin pieces of meat or fish and is popular on account of its quickness.

Foods which are Grilled

Meat Steaks chops cutlets (rump or fillet preferably the latter)

Poultry Birds

Fish Whiting trout mackerel salmon kippers bloaters

Preparation and Cooking

Meat should not be more than 1½ nor less than 1¼ in its thickness. To make tender beat it on a board with a rolling pin. Brush with oil or melted fat and sprinkle with seasoning. Grease bars of grill or gridiron.

Poultry Birds should be cut in half.

Fish Butter or grease well and (with the exception of kippers and bloaters) cover with greased thick glazed paper.

Lay food to be cooked on

heated grill or gridiron. If done over open fire, it should be clear, and free from smoke. Turn the food frequently, about every 2 minutes, with grill tongs or two forks, as piercing the meat with a fork lets out some of its goodness. If it is fatty it may be turned by sticking a fork or skewer in the fat.

The temperature should be high at first, in order to seal the juices in, and then lowered for subsequent cooking.

Time required for grilling depends upon the distance of the food from the grill, the heat used, and its thickness. The following list, however, will give some indication of the length of time required. Meat should be tested by pressing with a spoon. If well done, it will not rebound at all.

Steak 1 in thick	6-10 minutes
Chop 1 in thick	8-10 minutes
Cutlet $\frac{1}{2}$ in thick	6-8 minutes
Quails or pigeons	8-12 minutes
Slices of fish	10-15 minutes
Kippers	5-7 minutes
Bloaters	6-8 minutes

Grillparzer, Franz (1791-1872), Austrian poet, is famous for his tragedies in verse, these are mainly classical in spirit and form, and include *Sappho* (1818), *Des Meeres und der Liebe Wellen* (1831), and his masterpiece, *Der Traum, ein Leben* (1834). He also wrote lyrics and prose works. His plays show the influence of Calderon (qv) in their imitation of Spanish metre and expression.

Grilse, see SALMON

Grimaldi, Joseph (1779-1837), English clown. His father was an Italian actor. He was born in London, and made his first stage appearance at Drury Lane at the age of 2. His career continued until 1828, and he became the most famous of all English clowns, his part in *Mother Goose*, in which he first appeared in 1806 at Covent Garden, and as Squire Bugle, being his most successful. Charles Dickens edited his *Memoirs*, which were published in 1838.

Grimm, The Brothers, German philo-

logists and authors of the *Fairy Tales*. JACOB LUDWIG KARL GRIMM (1785-1863) was the discoverer, with Rask, of Grimm's Law (qv). His publications include *Deutsche Grammatik* (1819) and works on ancient German literature and mythology.

WILHELM KARL GRIMM (1786-1859) wrote many works of literary and antiquarian interest.

When he and his brother were professors at Berlin, they collaborated in their famous *Kinder- und Hausmärchen* (1812-15),



Wilhelm Grimm

on this work the science of folklore was founded.

Grimm's Law. This is the name given to the law discovered by the Danish scholar Rask (1787-1832) and elaborated by Jacob Grimm (see GRIMM, THE BROTHERS) concerning the principles governing the most striking phonetic difference of the Germanic group from the other members of the Indo-European family of languages. It relates to two shiftings of consonants, and the following table will indicate and denominate the consonants involved.

	Labials	Dentals	Cutlurals
A Voiceless Plosives	p	t	k
B Voiced Plosives	b	d	g
C Fricatives	f (v)	th	ch (g, g')

It is necessary, for the present purpose, to divide the whole Indo-European group of languages into three (1) Aryan, comprising all non-Germanic languages, (2) Low German, comprising all Germanic languages (including English) except (3) High German, the parent of modern German. The Law can now be stated as follows.

Arvan A group becomes Low German C group becomes High German B group Arvan B becomes Low German A becomes High German C Arvan C becomes Low German B becomes High German A

Examples Latin *tu* English *thou* German *du* Latin *duo* English *two* German *zwei* (no *th* sound in High German) Greek *thugater* English *daughter* German *Tochter*

The Dental series (*t d th*) conforms pretty regularly to the law but the Labials and *k* utturals less completely so

Grimshy town and port on the Humber Lincolnshire Its principal industry is fishing other activities



Royal Dock Grimshy

include ship-building tanning and brewing The dock area is extensive Coal cotton goods and woollens are exported Pop (1931) 9 463

Grimthorpe Edmund Beckett 1st Baron (1816-1903) for many years a leading member of the Bar taking silk in 18 4 He was made a baron in 1860 Grimthorpe was interested in ecclesiastical architecture and horology he was the designer of the Westminster clock tower and aided in restoring St Albans Abbey

Grinding *see* CRUSHING AND GRINDING

Griegoire Pierre (1475?-1538?) French playwright and poet a prominent member of the Parisian theatrical society *Les Enfants sans Souci* produced many satires political and

religious He attacked the Pope in a comedy *L'Homme Obstine* and in a poem *La Chasse du cerf des cerfs* (1610) His other works include occasional religious didactic and lyrical verse

Griqualand East district of Cape Province Union of South Africa Area 660 sq m Chief town Kokstad main export wool Its pastureland is good and sheep farming a profitable occupation The area is named after the Griquas a sturdy race descended from Dutch settlers and native women Pop (1931) 619 (Europeans)

Griqualand West, district of Cape Province N of Orange R Like Griqualand E it is mainly pastoral but unlike the E part it contains diamond mines It was annexed by Great Britain in 18 1 and incorporated as a part of the Cape 9 years later Area 1 197 sq m pop c 8 000 Capital Kimberley

Griselda [GRIZELD] a character of medieval romances who figures in Boccaccio (*Decameron*) and in Chaucer (*Clerk's Tale*) She was the daughter of a charcoal burner but married a lord who to test her patience forced her to undergo many great sufferings She remained patient and loving and her name now typifies uncomplaining patience and long suffering

Grisons canton in E Switzerland Area 1 746 sq m It is sparsely populated and mountainous maize is cultivated stock is reared and vines are grown on the slopes of hills There are mineral springs not over-exploited and the canton contains the source of the Rhine and the Inn St Moritz Davos and the Engadine are tourist centres The chief town is Chur (Corre) The German name of the canton is Graubünden Pop (19 0) 1 8 340 Area 27 0 sq m

Grit a deposit of sandy material in a cementing medium but more strictly such a rock in which the sand grains are angular in shape and fairly large Occasionally the rock may be composed of other minerals and according to the nature of the grains or cementing

terial, it is termed "calcareous grit" "felspathic grit," etc

Groat (Dutch, *groot* = thick), any thick or heavy coin, usually of silver, in the 13th cent onwards. A specific one, the groat, was struck in England in 1351, and was worth just over 1d. The penny and groat were steadily devalued, but the former more so, and the value of the latter became fixed eventually at 1d. The issue of groats ceased in 1662, but a fourpenny piece was revived for a short period after 1830. **Grodno**, province claimed by Lithuania, but since 1919 mostly occupied by Poland. It is flat, swampy, and watered by the Niemen. Agriculture is pre-eminent, and there is a small woollen industry. The area in dispute is 9,920 sq mi. The population of the area has been estimated at just under 2 millions. Chief towns are Grodno and Brest-Litovsk.

Grog, material mixed with clay to lessen its plasticity, generally ground tshierds or ballast. See also **CLAY**.

Grose, Francis (c. 1731-1791), English historian, whose journeys in search of antiquities inspired Burns's *Heard o' cakes, and blither Scots*. His searches were embodied in *The Antiquities of England and Wales* (1773-87), *Antiquities of Scotland* (1780-91), *Antiquities of Ireland* (1791), and in other books on curiosities of provincial and military history. His works include satirical poems and humorous essays.

Gross. (1) The whole, without any deductions or allowances, e.g. *gross price*, before the deduction of commission, discount, etc., by which the net price is arrived at. *Gross weight* is the total weight of a package, including the tare, or weight of packing, and the net weight of goods. (2) As a general unit of gross equals 12 dozen, a great gross equals 12 gross. (3) *In gross*, English law term denoting an incorporeal hereditament attached to a person, as distinct from one which is *appurtenant* or *appendant*, i.e. attached to the owner's land as such.

Grossmith, George (1847-1912), English comedian created most of the leading comic parts (Ko-Ko, Jack Point, Bunthorn, etc.) in the Gilbert and Sullivan operas; he retired in 1901. Author of *Reminiscences of a Society Clown* (1885), etc. His brother, **Wernor Grossmith** (1853-1919), was also a well-known comedian, and part-author with George of *The Diary of a Nobody* (1894), illustrated by himself. **George Grossmith junior** (b. 1874), son of George Grossmith, won fame as a comedian in musical comedy and revue, and became a successful theatrical manager.

Grote, George (1794-1871), English historian, a friend and follower of Jeremy Bentham and James Mill. He is best known for his *History of Greece* (1846-56), an epoch-making and standard work. It is especially notable for Grote's sympathy with democracy and for the chapter on Greek philosophy.

Grotius, Hugo (1583-1645), Dutch politician and writer on law, supported the Arminian heresy, and was imprisoned (1619) but he escaped to Paris (1622), where he remained for 2 or 3 years. His wide knowledge and versatility were amazing; he wrote on history, theology, politics, and law, composed poems in Latin and Dutch, and completed many translations of the classics. But his greatest work was *De jure belli et pacis* (1625), in which he laid the foundations of modern international law. In a period when great scholars were not few, Grotius stands out as one of the most important men-of-letters and inferior only to Erasmus.

Ground Ivy, a plant of the Labiate or Dead-nettle family, with trailing stems, kidney-shaped rough leaves with scalloped margin, and bright purple-blue flowers which mostly grow in threes in the axils of the leaves. The whole plant has a strong, aromatic, and not unpleasant odour. The leaves are often, in rural districts, dried and made into tea. The plant is common on waste ground and flowers in spring.

Ground Nut, see **ARACHIS**, **MONKEY-NUT**.

Ground Rent rent reserved by the owner of land let for building purposes. The usual term of a building lease is 99 or 999 years. Should the tenant transfer the lease the obligation to pay the rent is transferred to the new tenant. On the determination of the lease either by efflux of time or because of the tenant's breach of some covenant e.g. to pay rent the land together with the buildings erected thereon reverts to the ground landlord. A house subject to a ground rent is usually leasehold property (though ground rents on freehold properties are not unknown as at Bristol). On paying ground rent the tenant (whatever his own income) is legally bound to deduct income-tax at the standard rate and to pay over (through the usual channels) the tax thus withheld to the Commissioners of Inland Revenue. See also **LANDLORD AND TENANT LEASE**.

Groundsel, common weed flowering all the year round. The plant varies from a few inches to a foot high with leaves half embracing the stem and composite yellow flowers in crowded clusters. The flowers are a favourite food of many small birds.

Ground Sloths, a group of mostly gigantic extinct mammals of the order Edentata (q.v.) found in America. In a measure they concealed the living sloths with their ant-eaters. A few of them survived until the arrival of man but most of them died out before that time. Too bulky to climb they reached the foliage of trees on which they browsed by rearing up on their hind legs and grasping the branches with their fore-paws. The largest of them *Megatherium* was nearly the size of an elephant. Another *Mylodon* about equalling a rhinoceros had bones embedded in its skin like an armadillo.

Grouse a family of pheasant-like game-birds distinguished by their feathered feet. The name is usually applied to the red grouse of Great Britain which is very like the willow grouse of N. Europe and Asia but does

not turn white in winter. The red grouse inhabits moorland overgrown with heather on which it mainly feeds. In Wales the N. of England Scotland and Ireland.

Grouse-shooting see **SHOOTING**.

Grove Sir George (1833-1900) writer on music editor in chief of the famous *Grove's Dictionary of Music and Musicians*. Published a work on Beethoven and many musical articles.

Grub general name for the worm-like larvæ of insects especially those that burrow in wood or fruits e.g. the larvæ of the codlin moth.

Grub Street, a street in the parish of St Giles Cripplegate London running from Fore Street to Chiswell Street and renamed *Wilton Street* in 1839. It became the abode of unimportant writers and petty pamphleteers and so grew to be used as an opprobrious term applied to the authors of trashy and worthless literature.

Grün (or Grein) **Hans Baldung** (c. 1475-1545) German painter and engraver was born near Strasbourg and most of his life was spent in that town. His most famous painting is in the Cathedral at Freiburg. Examples of his portraits are in the National Gallery and at Vienna. His engravings on copper and wood are remarkably fine and are frequently mistaken for the work of Dürer. His mastery of drawing and sculptural form are his most notable characteristics.

Grundy Mrs. an imaginary character the epitome of English conventionalism and respectability. In *Speed the Plough* (1893) by Thomas Morton one of the characters continually speaks of her as the local judge of morals she never actually appears in the play.

Gruyère district part of the Fribourg canton Switzerland famous for its cheese. It has two capitals Bulle the modern and Gruyères the ancient town the former with a pop. c. 4400 the latter 900.

Guadalquivir river of S. Spain rising in the province of Jaén S. of the Sierra Morena and flowing into the Atlantic.

N of Cadiz Its length is 360 m In ancient times it was called Baetis

Guadeloupe, French colony, West Indies, consisting of two islands divided by a narrow channel called Riviere Salée The larger and W island, Guadeloupe proper, with its chief town, Basse-Terre, the seat of government, is the centre of education and industry The chief products are sugar, bananas, coffee cocoa, and rum Most of the land is under cultivation for local consumption Indian corn, tobacco, sweet potatoes Area of the united dependencies, 620 sq m, pop (1932) 267,407

Guadiana, river rising in Spain, forms the Spanish-Portuguese frontier near Badajoz down to Monsaraz, then passes into Portuguese territory for c 60 m running S to the Gulf of Cadiz, where it empties itself near Santo Antonio Length, 508 m

Guaiacol (*methyl catechol*) is found in the tar obtained on the distillation of beechwood, and also in the distillation products of some natural resins It is an oily liquid of creosote-like odour, and has a boiling-point of 205° C The solid melts at 28° C It is used in medicine as a disinfectant, and is also employed in the manufacture of various organic substances, such as catechol and vanillin (*qv*) Chemically guaiacol is an ether having the formula $\text{OHC}_6\text{H}_4\text{OCH}_3$

Guam, largest and most S island of the Mariana Archipelago, N Pacific, 32 m long and from 4 to 10 m wide Rice, coffee, maize and sugar are cultivated The Governor combines all executive and judicial powers English is taught in the schools and elementary education is compulsory Agana is the seat of government Guam was ceded to the United States by Spain under the Treaty of Paris, 1898 Pop (1932) 19 000

Guano, a deposit consisting of the accumulated excrement of birds or bats Bird guano, which forms the vast majority of such deposits, is typically found on islands inhabited by sea-fowl in the rainless areas off the W

coasts of S America and Africa, though the deposits in the former region are now nearly exhausted Guano is a brown powdery substance from which the soluble constituents may be extracted by rain or sea-water, leading to hardening of the beds Hence it is divided commercially into "soluble guano" and "guano leached" It is a valuable source of artificial manure, by reason of the phosphates it contains, and may occur in beds 100 ft. thick Bat guano is found in caves, as in Kentucky.

Guarana, a shrub (*Paullinia*) growing in Brazil The seeds are used to prepare a drink, foods, and medicine. The fruit is about the size of a grape, but contains one large seed only The medicinal value of guarana is due to the presence of caffeine

Guarantee or Guaranty, a promise to be answerable for the payment of a debt or the performance of an obligation by another, to take effect if the other defaults No action can be brought unless the guarantee is in writing See also DEL CREDERE

Guarantee Stocks, stocks which have not only the resources of the issuing company to back them, but also the guarantee of some larger company, or some municipal or State government In the latter case, the guarantee may be a form of subsidy to some essential undertaking, such as an air-line The guarantee may refer to interest only, or to the eventual refund of principal

Guards, The, Household Troops, as they are known in England, or bodies of soldiers personally attached to a sovereign or a leader for his protection In the latter sense, Guards are of great antiquity and probably antedate organised armies, famous examples being Xerxes' bodyguard, the Swiss Guard of Louis XVI, and the Old Guard of Napoleon The Yeomen of the Guard were formed in England by Henry VII in 1485, and the Gentlemen-at-Arms (*qv*) by Henry VIII in 1509 The latter body was reorganised on a military basis in 1862 The Royal Company of Archers, the King's body-

guard for Scotland was formed in 1666

Regiments from the active army the Household Cavalry and the Foot Guards also have this personal duty. The former and some of the latter regiments were formed at the restoration of Charles II (1660) incorporating detachments from the New Model Army and from Charles II's followers in exile.

The Household Cavalry were composed of the King's Troop, the Queen's Troop, and the Duke of York's Troop, the first two being known as the Life Guards (1685). The Royal Horse Guards or Blues were later added. The Grenadiers, the Coldstream, the Scots Guards, the Irish Guards, and the Welsh Guards form the Foot Guards.

Guarini, Giovanni Battista (1537-1611) Italian poet, author of *Pasto Fido* (1600) a pastoral play notable for its perfection of language. It had great influence on literature and conduct for many years as an epitome of courtly manners.

Guarnerius, Andrea (c. 1630-1698) violin maker, pupil of Amati. His sons Giuseppe (b. 1660) and Pietro (1655) also made violins, as did his nephews Pietro (b. 1635) and Giuseppe Antonio (1643-1740), the most famous of the family.

Guatemala, a republic of Central America, bounded by Mexico (W and N), British Honduras and the Bay of Honduras (E), Honduras and Salvador (SE), and the Pacific (S). Area

44,500 sq. m. pop. 2,400,000. Most of the population gravitates towards the Pacific side despite its heat for it is well watered and in the districts where the hills do not reach more than 5000 ft. it is very fertile. Many of the mountains are volcanic and seismic disturbances are fairly frequent. On the Atlantic side the rainfall is heavier and the forest lands more extensive. The drainage areas are unevenly divided by the Cordilleras. Agriculture is the most important industrial pursuit, coffee being extensively cultivated. The

banana crop is important, and sugar increasing in output. Over a million acres are forest land and the Petén district contains a quantity of exportable mahogany and a variety of dye woods. Owing to an indifferent transport system mining is undeveloped and only a few silver, gold, copper, and lead plants are worked. Chromium was discovered in the mineral area in 1916.

There are four important ports, two on the Pacific and two on the Atlantic seaboard, the chief export port being Champerico on the Pacific side. Auto traffic is possible for 9 months.



Statue of Christopher Columbus, Guatemala City

in the year. An air mail and passenger service connects the republic with San Salvador, Panama, and Mexico City. The currency unit is the gold *quetzal*. Military service is compulsory to the age of 30 and annual effectives total 6649 officers and men. The dominant religion is Roman Catholicism, but the State allows full liberty of worship to all creeds. There are a national university and nearly 2500 elementary schools. About 60 per cent. of the population are pure Indians, the ruling classes are however of European descent. The present constitution was rendered effective on New Year's Day 1935; its legislative power

being vested in a single chamber, elected by universal suffrage for a period of 4 years. A president is elected for 6 years, and is ineligible for re-election for 12 years.

An important agreement was reached in 1927 when the Foreign Ministers of Guatemala, Honduras, and Salvador agreed upon a unified or common policy in foreign affairs.

Guatemala was discovered by Spaniards in 1502, and established as a republic in 1847.

Guava, a tree called guayaba in S America, whose fruits make a delicious jelly. There are several species, the white abundant in the W Indies, the red in Jamaica, and others wild on the continent of S America. The fruit is about the size of a hen's egg.

Guayaquil, chief port of Ecuador, 33 m up the Guayas river. The public buildings include the governor's palace, cathedral, bishop's palace, and university. Pop 120,000.

Gudgeon, a small freshwater fish, related to the barbel, one species being found in Great Britain.

Guedalla, Philip (b 1889), English historian and essayist, is the author of *The Partition of Europe* (1914), *The Second Empire* (1922), *Palmerston* (1926), *The Missing Muse* (1929), *The Duke* (1931), and other works.

Guelphs and Ghibellines, two Italian parties in the Middle Ages. The Guelphs were the party of merchants and burghers siding with the Pope in his conflict with the Emperor, and late in the 16th cent with the King of France in his disputes with the Emperor Maximilian I. The Ghibellines were the opposite pro-Imperial party, consisting in the main of the knightly class.

Guerza, a group of arboreal tropical African monkeys related to the Asiatic langurs (*gu*), but having no thumb. The best known have long, silky, black-and-white hair, popular as a fur or rug.

Guérin, Pierre Narcisse, Baron (1774-1833), French painter, who became director of the French school at Rome

in 1816. He painted historical subjects based on Greek and Roman history, several examples of which are in the Louvre, Paris. His work is artificial, pompous, and melodramatic.

Guernsey, one of the Channel Islands, a popular winter resort. Area, 26 sq m, pop (with neighbouring islands); (1931) 42,806. The chief occupation is market gardening on a large scale. The export of granite is the one important industry. Guernsey cattle are celebrated. The climate is bracing, with an average of 5 hours of sun daily.

Guernsey is administered by Lieut-Governor, who also preside over Alderney and Sark, and an independent government. Sark is dependency under the jurisdiction of Guernsey. It has been an English possession since the Norman Conquest.

Guernsey is an island of plentiful bays and useful harbourage. St Peter Port is the capital, interesting by reason of its Victor Hugo associations, the great French writer living here from 1855 to 1870. Near Bordeaux Harbour, on the E, there are several important dolmens, a characteristic of the Channel Islands. The Paradis cromlech is the finest in the islands.

Guerrilla Warfare (*dim* of Spanish *guerra* = war), irregular and unorganised fighting, especially that carried on by primitive or nomadic tribes, e.g. the Arabian revolt against the Turks (1916). Guerrilla warfare often verges on brigandage, and the Hague Conference of 1907 held that irregular bands should only be recognised as belligerents if they were led by some person responsible, if they wore some distinctive badge, if they carried arms openly, and if they conformed to the rules of war. Guerrilla warfare, such as that frequently carried on by tribes on the N.W. Frontier of India, is to-day usually opposed by aeroplane bombing or by armoured cars.

Guesclin, Bertrand du (1320-1380). French soldier. He fought for Charles of Blois against Brittany and England;

at Rennes (1356) against the English when he had a famous combat with Sir Thomas Canterbury and in Spain (1366) against Pedro the Cruel when he was captured by the Black Prince. In 1370 he was made Constable of France and until his death fought with success against the English.

Guiana, Brazilian district in the N of Brazil between the Amazon and Venezuela and British Dutch and French Guiana. It was formerly known as Portuguese Guiana.

Guiana, British, S. American colony bounded E. by Dutch Guiana, S. by Brazil, W. by Venezuela, N. by the Atlantic. Its staple production is sugar. Rice, coffee, rum, bauxite, some timber, diamonds and gold are also exported. Originally Dutch it was ceded to Britain in 1814 though they had actually occupied it since 1781. There are about 100 m. of railways. The chief towns are Georgetown (capital) and New Amsterdam. A large number of immigrants from British India are included in the population. In 1953 a new constitution came into force. Area 89,480 sq. m. pop. (1930) 312,500.

Guiana, Dutch, see DUTCH GUIANA.
Guiana, French, French colony in S. America. It is the smallest of the Guianas and the only one where gold mining is the principal occupation. Little land is given over to agriculture. Cayenne is the capital. Area 34,740 sq. m. pop. (1927) 47,350. To the colony belong Devil's Island and two others forming the *Iles de Salut* used as convict settlements, also the *Enfant Perdu* Island and the Remoin group.

Guiana, Venezuelan, district (formerly known as Spanish Guiana) between the Orinoco and the Rio Negro, now part of Venezuela.

Guicciardini, Francesco (1483-1540) Italian historian and diplomat held many high positions under Pope Leo X., Clement VII. and the Medici family. He did not disdain the vilest commissions so long as he kept his place. His great work the *Storia*

d'Italia (pubd. 1561-4) is concerned with the years 1494-1539.

Guido d'Arezzo (or *Guido Aretinus*) (c. 990-1030) early musician a monk in the Benedictine monastery of Pomposa. He originated the name *ut re mi fa sol la* for the first six notes of the scale and has been called the father of modern music.

Guildford a market and (till 1939) county town of Surrey. Of its ancient importance as an industrial centre only the weekly markets and the bi-annual sheep fairs remain. Among its interesting old buildings are St. Mary's Church, Abbot's Hospital, a gift of Archbishop Abbot, a native of Guildford, the millioned and gabled Grammar School founded by Edward VI (1563) and a 17th-cent Guildhall. The town during the Middle Ages was governed by a strong merchant guild. Local history asserts that the Canterbury Pilgrims came by way of Guildford, crossing the Wey at St. Catherine's Chapel and by Shalford to St. Martha's Hill. Guildford has recently become the seat of an Anglican diocese and a cathedral is to be built in the town. Pop. (1931) 30,753.

Guildhall a meeting place for the guilds (q.v.). The English merchant guilds had monopolies in the commodities they traded in and could fine unauthorised traders. The present city companies of London are a survival of this form of organisation. The London Guildhall meeting place for the various bodies of the Corporation of the City of London is a composite building, the crypt and great hall dating from 1411 and the roof from 1864, the art gallery, library and part of the museum being of still later construction. The hall is magnificent and of admirable proportions. Brass plates in the floor show the length of the standard foot, yard etc. In the gallery stand Gog and Magog, two giant figures, replicas of two which were formerly a feature of the Lord Mayor's procession. The Museum contains a fine collection of

London antiquities, including ancient weapons, Roman pottery, inn-signs, and mediæval jewellery. There is also a collection of clocks and watches. There is an extensive reference library and a newspaper-room. The art-gallery is small but interesting. The crypt has a very fine vaulted roof, and many doors and staircases which formerly led to parts of the building once destroyed, much of it having



The Guildhall, London

been consumed in the Great Fire of London in 1666.

Guilddhall School of Music, see MUSICAL INSTITUTIONS

Guilds, trade and craft associations of the Middle Ages which maintained the interests, skill, and general supervision of their particular craft. They developed from the Saxon "frith-gilds," or associations of freemen, and their part in education, insurance, commerce, and local government only grew up later. Most mediæval merchant guilds were granted a monopoly within a certain area, and their formation was at first

controlled by the king. Later the craft-guilds grew in importance, and dominated the others. The guilds were bound up with the apprentice system (see APPRENTICE).

Guillemot, a sea-bird of the auk (71) family which breeds widely on precipitous sea cliffs of the N. Atlantic. They lay a single large egg on a ledge of rock, without any nest. When the young can fly, the communities disperse to sea where, being expert divers, they live on fish. After rough weather they are frequently washed ashore, emaciated, on the S. coast of England. Many are poisoned by waste oil from shipping.

Guillotine: (1) An instrument for the execution of criminals. It consists of two upright posts grooved to receive and guide a heavy oblique-edged knife, which is held at the top. When the knife is released it falls and decapitates the condemned man. The guillotine is an old invention, there are records of its use in England and Scotland in the 17th cent., in Germany and Italy in the 16th cent. During the French Revolution it was revived at the suggestion of a Dr. Guillotin, from whom it received its name, and became extremely popular. It is still used in France and Belgium.

(2) Parliamentary device for limiting the length of debates on important bills which meet with obstructionist tactics. A certain time-limit is set for the discussion of each clause, and at the expiry of that limit the clause must be voted upon. The guillotine can only be applied by resolution of the House. (3) See BOOKBINDING.

Guinea, formerly a coin minted of gold from Guinea, and given the nominal value of 21s in 1717, though its market value was less. No such coin exists to-day, but the guinea is still used as a unit of account by professional men, writers, and some shopkeepers.

Guinea, French, on W. coast of Africa, between Sierra Leone and Portuguese Guinea. The products are

varied and include rubber palm oil nuts rice bananas pineapples and coffee. An experimental garden near Conakry the capital is progressing rubber bananas and pineapples forming the major experiments. A little gold is found in the Tinkisso R. Area c 89 436 sq m pop (1931) 2 936 968

Guinea, Portuguese on coast of W Africa is almost entirely enveloped by French territory. Principal products are rice oil hides and wax. Capital Bissau Area 13 944 sq m pop (1930) 304 99

Guinea, Spanish, territory in W Africa including a number of islands. Much of the area is forest land with patches of luxuriant vegetation. There is a Methodist mission at Santa Isabel the capital on the island of Fernando Po. The territory is harbourless and the rivers are unnavigable. There are no industries. Area 10 036 sq m pop c 140 000

Guinea fowl a domesticated fowl like bird distinguished by a horny helmet and plumage speckled with white. They are natives of Africa and Madagascar the domesticated species came from Senegambia

Guinea pig *see* CAVY

Guinea worm, a parasitic thread worm 2 or 3 ft long which in tropical Africa and parts of Asia lives under the skin of human beings usually in the leg where it sets up an abscess through which the young escape making their way into any water available. In the water the worm lives in a small crustacean. By careful twisting the adult worm can be extracted but if it should break in the process the young getting into the human blood may set up serious septicæmia. This is thought to be a cause of elephantiasis

Guinegate Battle of (Aug 16 1513). Henry VIII landed at Calais and with an army of 30 000 was joined by the Emperor Maximilian. They invested Terouenne and at Guinegate routed the French who came to raise the siege. It was called the Battle of Spurs because the French galloped away

Guinevere *see* ARTHUR KING

Guinness Family Irish brewers head of a firm founded c the middle of the 18th cent. by Arthur Guinness. His third son Benjamin Lee Guinness (1798-1863) became head of the firm in 1825 and developed an export trade to the United Kingdom the U.S.A. the Continent and the colonies. In 1841 he became first Lord Mayor of Dublin and (1860-5) restored St Patrick's Cathedral. He entered Parliament for Dublin as Conservative in 1865 and 2 years later was made baronet. His third son Edward Cecil Guinness (b 1847) converted the brewery into a limited company remaining the largest shareholder. He was created a peer with the title of Baron Iveagh in 1901 and became Earl of Iveagh in 1910 dying in 1937

Guinness the popular name of the firm a famous stout is now one of the most important exports of the Irish Free State and was excluded from the extra tariffs levied on imports from that country to the United Kingdom in 1903. The ordinary capital of the company is now £7 500 000. The breweries employ 3000 men and supply the bulk of the £5 millions annual beer exports of the Free State. Intensive advertising has in recent years greatly increased sales

Guipuzcoa, maritime province of N Spain rich in mineral wealth and forest. It has a fertile area producing maize and fruit and ample pasture for cattle rearing. Its fisheries are a source of revenue and its capital San Sebastian noted as a watering place. Area 7 8 sq m pop (1931) 300 686

Guiscard, Robert (1015-85) Norman warrior and first Duke of Apulia and Calabria raised an army to fight the Calabrians and Greeks in Italy and championed the papal cause against the Greeks and Saracens. In 1081 he invaded the Byzantine empire and defeated the emperor Alexius Comnenus. After returning to Italy to fight the Emperor Henry IV he went again to the E. where he died

Guise, a town on the Oise in department of Aisne near St. Quentin

France. It has important quarries, and its chief industry is the manufacture of iron-ware. In 1339, the English, under John of Hainault, burned the town, but the castle was successfully defended by the wife of its lord, John of Hainault's daughter. In the Rue de Cambrai was founded by J. B. Godin in 1850 the *Famistière*, or co-operative workmen's colony, on a plan advocated by Fourier (q.v.) Pop 7,100

Guise, Dukes of. CLAUDE OF LORRAINE (1496-1550) became the 1st Duke, and distinguished himself as a soldier in many campaigns. Of his 12 children Marie became the wife of James V of Scotland and the mother of Mary, Queen of Scots. FRANCIS, the 2nd Duke (1519-1563), inherited his father's military skill and prowess, successfully defending Metz against Charles V in 1552-3, and taking Calais and other towns in 1558. He became the leader of the Catholic party, after defeating the Huguenots at Dreux (1562), but the following year was killed by a Huguenot. The 3rd Duke, HENRY (1550-1588), carried out a policy of vengeance against the Huguenots for his father's death, being one of the instigators of the St Bartholomew massacre (1572). He formed the Catholic League, the power of which body ultimately alarmed Henry III, who treacherously and successfully plotted the duke's death. HENRY 5th Duke (1614-1664), made an unsuccessful attempt on the crown of Naples in 1647. The title became extinct in 1688.

Guitar, a stringed instrument of the lute family played by plucking the strings with the fingers. There are 6 wire strings tuned E, A, D, G, B, E, which sound an octave lower than the notes. The finger-board is similar to that of the mandoline. A present-day performer who combines virtuosity and artistry in his performances on the guitar is the Spaniard, Andres Segovia.

Guitry, Lucien-Germain (1800-1925), French actor, first appearance 1878, director of Théâtre Michel, St

Petersburg, 1882-91. Visited London, 1902, 1909, and 1920. His son is Sacha Guitry (q.v.)

Guitry, Sacha (b. 1885), French playwright and actor. He was born at St Petersburg, son of Lucien Guitry, a distinguished French actor. His first work was a comic opera, *The Page* (1901), *Nono*, a three-act play, was produced in 1905. He has written nearly 50 pieces, acting in most of them himself. His latest work is *La Troisième Chambre* (1932). He is the husband of the actress Yvonne Printemps, who has made brilliant appearances in his plays.

Guizot, François Pierre Guillaume (1787-1874), French politician and historian, whose first work, a translation of Gibbon's *Decline and Fall*, appeared in 1805. From 1815 to 1820 he led the *Doctrinaire* party, but its fall in 1820 brought about his temporary retirement. During this time he wrote a *History of the English Revolution* (1826-7) and a *History of Civilisation in Europe* (1828) and in France (1829-32). From 1830 to 1848 he held very high positions in the Government, and carried out many sweeping reforms, but after the Revolution of 1848 he retired permanently. His remaining years he spent in completing his histories and in the composition of his *Mémoires* (1858-68). His historical method is notable for its interpretation, rather than mere statement, of facts.

Gujrat: (1) District, British India in the Punjab. It forms one of the two spheres of irrigation in the Bombay Presidency. There is an important trade in wheat, cotton, oil, and hides. Following severe famine and pestilence in 1813-14, it was the theatre of a bloody campaign until Sikh power was ultimately broken by a British force under Lord Gough (1849). Area, 2,563 sq. m., pop 827,000.

(2) Town in the Punjab, British India. Its manufactures are cotton and leather goods, coloured shawls, brass ware, and light household furniture. The town is of some antiquity.

but the only remains are a fort and a shrine Pop 22 000

Gules see HERALDRY

Gulf Stream, see OCEAN CURRENTS

Gulls a family of typically sea living birds closely related to the plovers but distinguished by having the toes webbed for swimming Gulls how ever are not expert swimmers seldom



Gull

plunging beneath the surface of the water to catch fish They eat almost anything—insects earth worms fish small birds eggs carrion or bread When adult their colour is typically grey above with white below and on the head but immature birds are mottled brown Gulls have a peculiarly easy graceful flight Best known British species are the black backed gulls the herring and black headed both of which invade London in the winter the common gull and the kittiwake which nests on sea-cliffs The others like plovers nest on marshes or moorland

Gum Arabic (or *Acacia Gum*) is obtained as an exudation from various varieties of acacia growing in tropical and sub-tropical climates There are numerous varieties on the market the best being Lordofan or Cordofan (also known as white Senaar) which comes from the Sudan

It is water soluble forming a viscous solution employed as an adhesive in the preparation of various emulsions and for the thickening of ink

Gunn, a weapon which discharges a projectile by the expansive force of an explosive generated behind the projectile in a tube Technically they are divided into *small arms* and *ordnance* or great guns also called *cannon* *Artillery* includes all weapons

too heavy for use in the hand Apparently fire arms were invented in Europe c 13th 0 in the forms of a very short *mortar* and an iron bottle from which an explosive threw an arrow Guns were certainly used in European warfare after c 13 5 on both sea and



Arquebus the predecessor of the musket

land Some of these early guns were of very large calibre one the Flemish Dulle Griete fired a 75 lb ball Early hand guns with iron or brass tubes had straight stocks and were fired from a touch hole The next step was the *match lock* invented c 1468 in which the match was brought down to the touch hole by a trigger Then came the *wheel lock* in principle exactly like the present-day pocket lighter a steel wheel being revolved so as to rub against and strike sparks from a piece of iron pyrites The wheel was revolved by a spring which was released by a trigger In the 16th cent the use of flint and steel came in and the *flint lock* still used in primitive countries was developed Ignition by *percussion* was invented by an English clergyman Alexander John Forsyth and was first used by private individuals The percussion cap employing fulminate was invented in America in 1814 and 20 years later was adopted by the military authorities of Great Britain

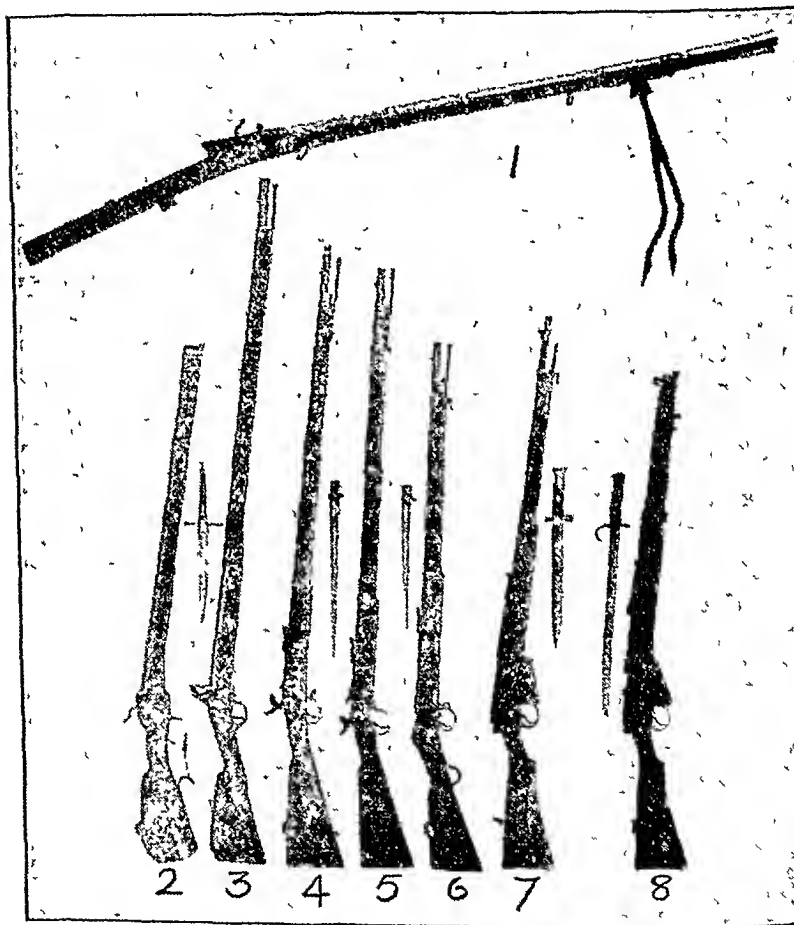
The next epoch making invention was *rifling* though the idea and even



Cross-section of Rifle Barrel

practice of this goes back to the 16th cent Its advantages could not be realised so long as bullets and shot were made spherical An elongated bullet on the other hand cannot be fired accurately at all through an

unrifled barrel, but when it is given a rapid spin by the use of the latter, the accuracy obtainable is enormously increased



The Evolution of Fire arms from the Match lock to the short Lee Enfield

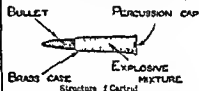
- 1 Match lock with stand, 1185
 - 2 Wheel lock, 1530
 - 3 Flint lock, 1635
 - 4 Percussion, 1810
 - 5 Breech loading percussion, 1869
 - 6 Martini Henry, 1869
 - 7 Long Lee-Enfield, 1893, with short bayonet
 - 8 Short Lee-Enfield, 1903, with long bayonet
- } 2 and 3 were used with "plug" bayonet shown
 } 4, 5 and 6 were used with triangular bayonet

In a rifle or rifled great gun the bore is given a number of longitudinal grooves having a slight twist which has varied considerably in the course of evolution. The modern British Army rifle has a twist of 1 turn in 10 in. The development of rifle barrels to their present accuracy and durability has been a long and difficult matter closely affected by the nature of the propellant explosive used. Two difficulties in the latter may arise: the deposition of material in the barrel and corrosion. Closely associated with these two factors is the problem of wear. Black powder especially in its earlier forms left heavy solid deposits while modern smokeless powders generate nitric acid which is very corrosive. A rifle needs careful cleaning after use if it is not to deteriorate rapidly. Modern nitro-cellulose powders are much less corrosive than the older nitroglycerine compounds such as cordite.

The advantage of rifling is due to the fact that the projectile owing to the gyrostatic effect (see *GYROSCOPE*) of the spin maintains its direction in space constant: the effect of the air on its flight is therefore definite and always the same, whereas a ball fired from a non-rifled barrel will have some kind of indefinite spinning motion in a haphazard direction and an elongated shot will turn over and over in a tortuous manner.

Another important feature in gun construction was introduced in France about chiefly developed in England by Armstrong in the middle of the 19th cent. This consists in building up a big gun by shrinking wrought iron or steel in layers upon a central tube. This was at first done by winding the tube with wrought iron tape hot enough to weld. This enabled the great tensile strength of wrought iron along the fibre (see *IRON AND STEEL*) to be used to resist the bursting strain in the gun, the iron being left in tension when it cools and contracts. At that time modern methods of steel making had not been developed. Modern big

guns are made on the shrinkage principle steel tubes being generally used but a layer of steel tape on the original Armstrong principle is still also employed the tension being obtained by winding under strong tension without welding the wire being covered by a steel tube shrunk on hot. It should be noted that according to *Barlow's principle* the strength of a tube to resist internal pressure does not increase proportionately to its thickness: the effect of each equal increase of thickness becomes less and less and practically nothing is gained by having the walls of a tube thicker than the diameter of its bore. A gun must not be permanently strained when fired: its diameter increases under the tremendous stress but this increase must not exceed the elastic limit of the material (see



ELASTICITY) By putting the internal layers of the gun in a state of compression the range over which it can expand without permanent damage is increased. A 15 in. wire wound gun may have nearly 200 m. of steel tape which bears the chief bursting stress.

All types of gun are now fired by percussion: the percussion charge, propelling charge, and projectile being combined in one cartridge case up to calibres of c. 4.7 in. For larger guns the projectile charge and the primer are placed in the gun separately.

The machine gun though foreshadowed much earlier could not be developed until firing by percussion had been developed. As soon as the cartridge complete with bullet and percussion cap existed a great variety of mechanically operated guns were made in which loading and firing was performed rapidly at first by turning

a handle The best known of these was the *Gatling gun*, used in the American Civil War, and the French *mitrailleuse* used in the war of 1870 These were multi-barrelled guns, the latter having 37 barrels, the rate of fire was c 600 rounds per minute A new principle was introduced by Maxim in 1889, who used a single barrel cooled by a water jacket, and caused its recoil to operate the ejection of the spent cartridge, and re-loading and firing The cartridges are carried in a canvas belt, also an innovation of Maxim's This gun fires from its one barrel at the same rate as the old multi-barrel construction Modern light machine guns are aircooled A new principle has been introduced in the *Lewis gun*, which is operated by the pressure of the gas in the barrel, the latter having a hole near the muzzle leading to a cylinder containing a piston The motion of this piston winds up a spring by means of a rack and pinion, and the power thus stored is immediately returned to the piston, forcing it forward again As in all modern rifles, the breach of the barrel is closed by a bolt, that is to say, a cylindrical piece which slides in the direction of the axis of the barrel In the rifle this is moved by hand to open and close the breech, in the Lewis gun, by the motion of the piston In all modern guns the projectile is provided with a ring of soft metal, which is forced into the rifling by the explosion of the charge, and thus grips it This is necessary, since the barrel steadily increases in diameter through wear, and the power of the charge would soon be diminished by leakage of gas past the projectile This prevents bullets being given a streamline form (see *AERODYNAMICS*), which would greatly reduce the resistance of the air

When we come to the mounting of large guns, the dominant fact is the enormous force of the recoil The gun must be allowed to move backwards, and provision must be made for absorbing the energy of this motion and bringing it rapidly to a standstill

In early days, both on sea and on land, the gun was mounted on a carriage on wheels, and this ran backwards when the gun was fired, the energy soon being absorbed in the heavy friction of the small wheels For field artillery, however, mobility of the gun depends upon the use of large wheels which enable the gun to be pulled over rough ground without great resistance All modern guns, therefore, are mounted on a cradle which can slide when the gun recoils The energy of the recoil is absorbed partly by a brake which dissipates it as friction, and partly by a *recuperator*, that is to say, a means for storing it in the form of the compression of a spring or of air Springs are used only with small guns, for larger ones air compression is employed through the intermediary of oil The energy stored in the recuperator is immediately used to restore the gun to the firing position

The fundamental problem, to which everything is accessory, is accuracy of fire This depends upon a great number of factors Variation in the explosive force of the charge, or in the efficiency with which it is used to give motion to the projectile, will affect the muzzle velocity The projectile will be affected, as regards the course it takes through the air, by a number of factors depending on the state of the air, apart of course from the action of gravity The action of the air upon it is extremely complicated, for as soon as it disturbs the motion of the projectile, the gyrostatic effect of the rotation comes into play This causes the nose of the projectile to move in a spiral path, which again results in a sideways drift, that has to be allowed for in sighting the gun The air, of course, offers a powerful resistance to the motion of the projectile, a resistance which depends upon its own motion, density, temperature, and degree of moisture In the case of a shot fired at high elevation, all these factors vary from point to point of the path of the shell The long-range gun used by the Germans to bombard Paris

over a distance of 76 m attained this enormous range because the shell passed into the much lighter upper layers of the atmosphere reaching a height of 10 m. This necessitated firing at an angle of 53°.

In order to hit an object which can neither be seen or is known to be in a certain place two operations are necessary as a rule. Firstly all the factors which prevent the projectile from taking the straight path or the simple parabolic path due to gravity must be allowed for. Secondly the direction of fire must be corrected when the results of it are ascertained. When the gun is aimed by sight the sights are made adjustable to allow of a certain correction being given for distance and windage. When the object cannot be seen the angle and direction of fire must be calculated. Special calculating machines of extreme ingenuity and complexity have been devised to increase rapidity of fire. Whenever possible a natural or artificial aiming point is made use of when the target cannot be seen in order that the gun may be kept in the correct line of fire. The position at which the first shots fall may be determined by the gunner if he is able to see the target but are more commonly determined by observers situated either on high observation posts or in aircraft. In getting the range the gunner fires deliberately both short of the target and beyond it noting the corresponding elevation and then endeavours to strike the correct point between these two.

Artillery guns are divided into two main classes those with a flat trajectory and those which fire high called howitzers. High elevation however results in loss of accuracy and howitzers are used only to reach targets such as deep trenches where it is necessary that the shot should fall almost vertically. However all guns are now arranged so that they can fire at a high angle and the charge is also varied so that high angle fire with a reduced charge can be utilised when

effective the wear of the gun being thereby reduced.

The sporting shot gun fires a charge made up of a large number of lead pellets. The barrel is of course smooth but it has one extraordinary peculiarity namely that it decreases in diameter towards the muzzle. This is known as choke boring and has the effect of preventing the shot from spreading too much. Sporting guns are usually double barrelled and have various bores the twelve bore most commonly used for game shooting firing about 1 oz of shot thus covers a circle 30 in. in diameter at a range of 30-40 yds. See also BALLISTICS EXPLOSIVES.

Gun-cotton, a form of nitrated cellulose (nitrocellulose) which contains c. 13.5 per cent of nitrogen. It is prepared by soaking cotton wool (at a temperature below 10° C) in a nitrating mixture consisting of 70 per cent concentrated nitric acid and 20 per cent concentrated sulphuric acid for 24 hours and then washing free from acid and drying. The substance is very inflammable and if compressed and detonated it explodes. Gun cotton is used in the manufacture of several kinds of explosives (qv).

Gungl, Joseph (1810-1884) Hungarian composer of many popular marches and dances. Was a bandmaster.

Gun Metal, see ALLOYS BRONZE.

Gunnery the science of employing fire-arms a technical study involving metallurgy dynamics mechanics and other subsidiary sciences. Such accuracy has been attained in the factors of gunnery that firing at invisible targets was quite common during the World War the aiming data being largely collected by air reconnaissance.

Gunpowder the earliest explosive used has now given way to a large extent to more modern and powerful propellants. Its composition varies considerably but on the average it may be said to consist of 70 per cent potassium nitrate (saltpetre) 10 per cent of sulphur and 15 per cent of charcoal.

Gunpowder is usually stated to have

been invented by the English alchemist Roger Bacon in approximately 1250, its earliest recorded military use being at the battle of Crécy in 1346. *See also* EXPLOSIVES

Gunpowder Plot, The, a conspiracy formed by Catesby, Sir Everard Digby, Guy Fawkes, and others to blow up the King and Parliament on their meeting on Nov 5, 1605. It was betrayed by one of the conspirators, all of whom were either killed during their flight or subsequently arrested and executed (Jan 30-31, 1606). The conspiracy was intended as a vigorous protest against the anti-Roman Catholic laws, the view that it was a Protestant plot to discredit Roman Catholics being now largely refuted.

Gunter, Edmund (1581-1626), English astronomer and mathematician, born in Herefordshire. About 1606 he invented the sector. In 1619 he became Professor of Astronomy at Gresham College, London, and later invented the logarithmic rule still known as Gunter's scale. He is said to have been the first to plot a magnetic, as distinct from the geographical, pole.

Gurkhas (also *Ghurkas* or *Goorikhas*), dominant race of Nepal. They are of Hindu descent, with a Mongolian strain, and are subdivided into the Kha, Mangar, and Gurung tribes. Primitively they were animistic, but the Kha, who speak Sanskrit, and the Mangar, follow Hinduism, and the Gurung a form of Buddhism. They were driven from Rajputana by the Mohammedans and conquered Nepal in 1768. They form some of the best troops of the Indian Army, and supported England during the Mutiny. The 10 Gurkha regiments participated in the World War.

Gurnard (or *gurnet*), a large-headed marine bony fish with the fore-part of the pectoral fin forming three finger-like tentacles, by which the fish crawls along the bottom of the sea and feels the crustaceans or other prey on which it feeds. Gurnards are generally brilliantly coloured.

Gurney, Sir Goldsworthy (1793-1875), English inventor, who gave up surgery and medicine in 1823 to devote himself to mechanical science, inventing, among other things, the oxy-hydrogen blow-pipe, the magnesium- and lime-light, and the high-pressure steam-jet. He designed the lighting and ventilating systems of the Houses of Parliament.

Gustavus I Vasa (c 1490-1560), King of Sweden, as a young man was imprisoned at Jutland by King Christian of Denmark. He escaped and later (1521) managed to rid his country of Danes with the aid of the indignation aroused by the massacre at Stockholm in the previous year. He was crowned King of Sweden in 1523. During his arduous reign he successfully coped with several rebellions, established Protestantism in Sweden, founded a navy, and showed himself to be a conscientious and able king throughout the 37 years of his monarchy.

Gustavus II Adolphus (1594-1632) became King of Sweden in 1611. Two years later he ended the war with Denmark, and in 1617 the Peace of Stolbova concluded the war with Russia. In 1621, however, he again caused Sweden to go to war with Poland which lasted till 1629. Gustavus then entered the Thirty Years' War out of sympathy with the German Protestants, and also from fear that the Baltic ports might be captured by the emperor and so become a danger to Sweden. He occupied Stettin, failed to relieve Magdeburg, vanquished Tilly at Breitenfeld, and later defeated him again at Ingolstadt. He was repulsed at Nuremberg by Wallenstein and Maximilian of Bavaria. He was killed at the battle of Lützen (Nov 16, 1632) in the moment of victory.

Gustavus III (1746-1792), King of Sweden, an enlightened and cultured monarch who abolished the *Cap* oligarchy (the two powerful political factions in Sweden at that time were known as *Hals* and *Caps*), increased the naval and military strength of the country while fostering the arts, advo-

ated religious tolerance and extended race. He fought against Russia (1788-90) winning a great naval victory at Svenskund (1800) which was followed by the Peace of Varälä. He was assassinated.

Gut, see DIGESTIVE SYSTEM

Gutenberg, Johannes (c 1400-c 1467) German printer usually regarded as the inventor of movable types if not the pioneer of the art of printing. One of his earliest productions was the *Mazarin Bible* (1456) known also as the *Bible of 42 Lines* owing to the fact that each column has 42 lines. Others were the *Bamberg Bible*, *Scheikorn's Bible* and *Pfister's Bible*. He worked at Strasbourg and Mainz. Authenticated copies of his work are very rare and command exceedingly high prices.

Guthrie, Sir James (1853-1930) a Scottish painter of the Glasgow school. Guthrie was elected an Associate of the Royal Scottish Academy in 1888 and became President of that body in 1900, being knighted the following year. He first became known for his paintings of Scottish landscapes with figures, the *Funeral Service in the Highlands* being a typical example of his early work. Later he confined himself mostly to portraiture.

Guthrie, Thomas Austrey see ANSTREY

Guthrum (d 890) Danish invader of England. Defeated by Alfred at Ethandun in 878 he became a Christian and by the Treaty of Wedmore was granted the Kingdom of E. Anglia.

Gutta percha, a substance resembling rubber prepared from the dried milky juice of trees found chiefly in the Malay Archipelago of the genus *Palasium* of the order Sapotaceae which grow to 100 ft. The juice taken from incisions in the bark is kneaded under running water and rolled into sheets to dry then heated and revolved on a masticator until fit for use. Gutta percha resembles rubber (qv) but is less elastic, cannot be vulcanised and becomes plastic at a temperature of boiling water.

machinery as an insulator for coating golf ball and filling teeth.

Guy Thomas (c 1644-1724) founder of Guy's Hospital, London. He was the son of a lighterman of Southwark but when young accompanied his widowed mother to Tamworth where in 1678 he founded an almshouse. In 1695 he was elected member of parliament. Guy lived simply but he endowed all his poor relations built a town hall at Tamworth and discharged insolvent debtors. In 1694 as Governor of St Thomas's Hospital he built and furnished 3 new wards with accommodation for 64 patients. In 1711 he leased a piece of ground for 999 years and built Guy's Hospital for which he set aside £19,000.

Guyot, Yves (1843-1928) French journalist and economist. Editor of *Le Journal des Economistes* (1900). His works include *The Comedy of Protection* (1901), *Economics* (1881) and *Socialist Tyranny* (1893).

Gwalior (1) Large t. State in Central India. A considerable amount of land is under cotton and sugar-cane. Cotton goods, carpets and muslins are manufactured. The inhabitants are mainly Hindus. A department for the purpose of developing the irrigation area has been set up. The present ruler was born in 1916 and the administration is conducted by a Council of Regency. Area 28,400 sq m. pop. (1931) 350,100. (2) Capital of (1) its most impressive feature is the medieval fort which stands on an isolated rock overlooking the town. The picturesque palaces and temples built within it are magnificent examples of Hindu architecture. The sculptures in the caves underneath the fort are world famous. The city consists of the old town and the new town called La. hkar. Pop. c 90,000.

Gwynn, Nell (1650-1687) English actress, mistress of Charles II. Originally an orange-seller at Drury Lane, her first recorded appearance was as Montezuma's daughter in Dryden's *Indian Emperor* in 1665 but she

excelled especially in comedy, Dryden providing her with many parts, one of her last appearances was in his *Conquest of Granada*, 1670. Her good temper and generosity made her extremely popular, and she is said to have induced Charles to found Chelsea Hospital.

Gymkhana (JIMKHA'NA), a word of Indian origin, said to have been first used in 1861, applied to a meeting for various sports, usually mounted, such as horse-races, tent-pegging, polo, and obstacle races.

Gymnastics (Gr *gymnos*, naked), physical exercises performed with or without apparatus usually in a specially equipped building known as a *gymnasium*. In ancient Greece physical training was regarded as an important part of every boy's education, and the *gymnasia* were public institutions, provided by the State, which entered for both mental and physical education, being provided with porticoes in which philosophers lectured. The most famous *gymnasia* at Athens were the *Academy* and the *Lyceum*, where Plato and Aristotle lectured to their disciples. *Gymnastic* exercises did not find favour among the Romans, and the educational value of physical training was not again realised until the early 19th cent., when a system of *gymnastic* schools (*Turnplätze*) was established in Prussia by F. L. Jahn.

Physical training also played an important part in the educational systems of Pestalozzi (1746-1827), and Froebel (1782-1852). In Germany the word "*gymnasium*" later lost its connection with physical culture, and is now applied to the highest grade of secondary school.

Organised gymnastics, as a valuable adjunct to education, developed in England towards the end of the 19th cent., and most schools now have well-equipped *gymnasia*, and hold inter-school contests. *Gymnastic* contests are also a feature of the modern Olympic Games. *Gymnastic* apparatus includes dumb-bells, Indian clubs, climbing ropes, vaulting-horse, parallel

bars, horizontal bar, trapeze, swinging rings, bridge ladder and wall ladders, and horizontal beam.

Exercises performed without apparatus are known as "*free gymnastics*." *Swedish gymnastics* are a system of therapeutic exercises invented by J. H. Ling (1776-1839).

Gymnosperms, which were the dominant form of vegetation in the Carboniferous period, are now represented by the Pine family and the Cycads (*qv*). The flowers are always unisexual, and except in rare cases have no perianth. The male flowers usually consist of a number of scales bearing pollen-sacs on their lower surfaces, and arranged as spirals or whorls on a long central axis. The pollen grains are generally spherical, and often have air-bladders to assist their dispersal by wind. The female flowers have scale-like, free carpels, which usually bear two ovules and are arranged on a central axis like the staminal leaves. The fruit resembles the female flower, but is larger. The *gymnosperms* are all woody plants and yield the *softwoods* of the timber trade. See also CYCADS, CONIFERS, ANGIOSPERMS.

Gyor, Hungarian town W.N.W. of Budapest famous for its horse-fairs. Its industries are textiles, agricultural machinery, and a State railway wagon works. The cathedral (12th cent.), town hall, seminary library and museum of the Benedictines comprise the buildings of interest. The town lies on the Raab, at its confluence with an arm of the Danube. Pop. 50,890.

Gyp, pseudonym of Sibylle Gabrielle de Mirabeau, Comtesse de Marté (b. 1850), French authoress. She has written many popular novels dealing with Parisian society, they include *Petit Bob* (1882), *Mariage de Chiffon* (1894), *Trop de Chic* (1900), *Maman* (1904), and *Les Hanchards* (1917).

Gypsies, see GIPSIES.

Gypsophila belongs to the Caryophyllaceæ or carnation family, and is a hardy plant with pink or white flowers valuable for cutting. The flowers are very small, and are borne in large num-

bers on much branched stems the leaves are arranged in pairs which alternate along the stem and are small ovate and pointed. The species are grown from seed sown out of doors in April the annuals sown when they are to flower and thinned the perennials transplanted in July.

Gypsum, hydrated calcium sulphate occurs as (1) colourless soft transparent to translucent crystals which split easily into thin flexible non elastic plates called selenite (2) laminated granular or compact masses called alabaster (qv) (3) a fibrous form satin spar. The massive form is of use commercially. Satin spar is sometimes used for ornaments.

There are three methods by which gypsum is formed. The most common is by the evaporation of enclosed basins of sea water such as the Dead Sea or the Great Salt Lake in the United States. The deposits at Stassfurt in Germany are due to this method. It may also be formed when limestone is dolomitised (see **Dolomite**) and by the action of sulphuric acid generated from decomposing iron and copper pyrites on shells and other lime-containing matter especially in clay deposits. Good crystals of selenite occur in many clay formations such as in London and Oxford clay.

Gypsum is used in the raw state for a variety of purposes. By heating it to a temperature of rather over 350 °F three-quarters of the water of crystallisation is driven off and the resulting product is plaster of Paris or calcined gypsum which by taking up water again and changing back to gypsum causes the plaster to set. It is never heated above 400 °F as that would drive off all the water and the plaster would not set. The calcined gypsum is drawn off and put aside to cool a retarder such as glue sawdust or lime being mixed with it to prevent it setting at once.

Calcined gypsum is chiefly used for various plasters for the manufacture of wall board for fireproof purposes or deadening, for floor tiles etc.

Other uses are for making moulds and castings and for embedding purposes. Raw gypsum is used as a fertiliser for soil and lately especially in the United States to retard the setting of Portland cement. See also **CALCIUM CEMENTS AND MORTARS**.

Gyrotory Crusher see **CRUSHING AND GRINDING**

Gyro-compass, see **GYROSTAT**

Gyroscope see **AERIAL NAVIGATION**

Gyrostal, a fly wheel mounted on bearings in a frame the latter being pivoted or otherwise held according to the purpose for which the gyrostal is

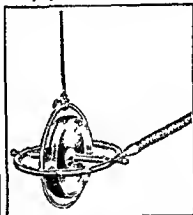


Fig 1—Simple Gyrostat

used. Fig 1 shows the toy commonly sold to exhibit the properties of the gyrostal. It is set spinning by winding a string round the spindle and pulling it off quickly. When hung up from a cord as in the figure an attempt to press down one end of the axis and so cause it to change its direction (as with the point of the pencil) is resisted by the gyrostal when the wheel is spinning. Instead of moving in the direction of pressure it turns its frame in a direction at right angles to this. If we hang a weight on one side (Fig 2) so as to keep that side pressed down the gyrostal revolves steadily. In order to understand this action it must be

remembered that any force acting on a moving mass so as to change the direc-

tail of the arrow, is moving vertically upwards. If the axis is tilted by pressing down with the point of the pencil, this moving part of the wheel tends to be diverted to the right. It resists this diversion by a force exactly like that which it would exert if diverted by a groove in which it was running, and this force, therefore, tends to twist the wheel in the direction indicated by the arrow on the frame. It will be seen that at the top and bottom of the wheel, the pressure of the pencil does not tend to change the direction of the motion, and therefore

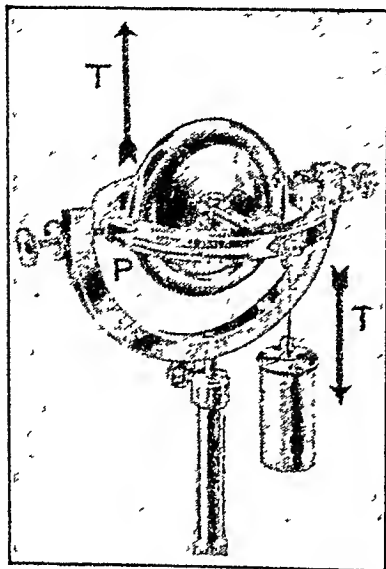


FIG 2

tion of its motion is resisted. If we have a ball running round a circular

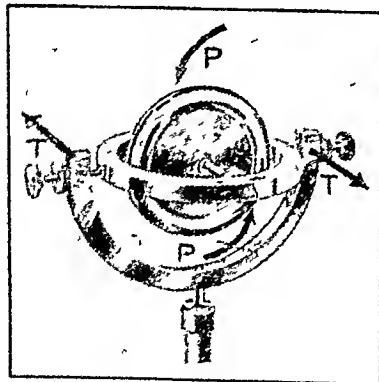


FIG 3

groove it exerts a pressure on the groove. In the diagram a part of the wheel, on the circumference near the

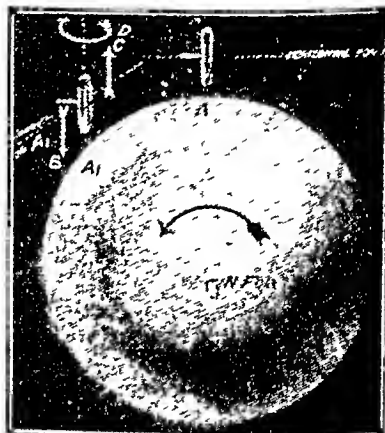


FIG 4

the force acts horizontally on the two sides of the wheel. This motion of the gyrostat, by which it evades a force tending to change the direction of its axis, is called "precession." This description may be better understood if the wheel be imagined as a hollow stationary case such as a ball-bearing case, in which a ring of balls is revolving rapidly. A ball when passing the top or bottom of the ring would not have to change its direction if the case were tilted as in the figure, the direction after tilting being parallel to the original direction, but a ball in passing vertically upwards or downwards would have to do so, hence the ball

would resist the tilting of the case by pressing against its side in such a way as to produce the motion of precession that is to say to twist the string in the direction shown by the arrow

The gyrostai is now finding several important applications. The simplest of these is the turn indicator employed on an aeroplane to enable the pilot to keep a straight course and now further developed to enable an aeroplane to be steered automatically. The principle of this is readily seen from fig 3 in which the frame carrying the gyrostai is pivoted with the axis of the gyrostai horizontal. The turn indicator is provided with a pointer travelling over a scale. The axis of the gyrostai is set horizontally and at right angles to the course for the pilot to take the frame marked T being fixed to the instrument case and so to the plane. If the pilot turns the plane slightly the axis of the gyrostai is turned as shown by the arrows TT and this causes the gyrostai to precess in the direction of the arrows PP. In the turn indicator a weight or spring is attached to the frame of the gyrostai which then precesses until the restoring force of the weight or spring is sufficient to prevent its moving farther. It then remains deflected as long as the pilot is turning. The deflection indicates the rate (in degrees of angle per second) at which he is turning. The automatic steering of an aeroplane on a set course

is then easily accomplished by any device which will move the rudder automatically in the correct direction the moment the turn indicator shows that the aeroplane is changing its direction

The most important application of the gyrostai is known as the gyro-compass. This depends upon the rotation of the earth. If we have a gyrostai spinning with its axis pointing E. and W. and contained in a frame which can turn about a horizontal axis the rotation of the earth tends to tilt the axis into a different direction which is also horizontal as regards the earth but is different in direction in space. Since the gyrostai takes no account of the direction of the earth's gravity in relation to which terms horizontal and vertical are usually defined it precesses until its axis is parallel to the earth's axis of rotation in other words it points to the true N and S. This is seen from the diagram fig 4 which also shows the direction in which the axis will turn. Two types of compass differing slightly in principle and known by the names of Anschütz and Sperry are now in practical use and are rapidly displacing the magnetic compass for all large ships. The compass is particularly adapted for automatic steering which is effected as in the case of the aeroplane by causing any deviation to move the rudder so as to correct it.

Haakon

Haakon, name of several Norwegian Kings

HAAGON I (d. 981) was educated as a Christian in England by King Æthelstan, by whose help he was able to sail to Norway on his father's death, and depose his half-brother. After vain attempts to convert his people to Christianity he was killed in battle.

HAAGON IV (1204-1263), called "the Old," disputed with Scotland regarding the Hebrides and defeated the Scots at Largs in 1263, the year of his death. His reign saw the submersion of the Icelandic chiefs to the Norwegian King.

HAAGON VII (b. 1872) has been King of Norway since 1905, after the separation from Sweden had been peacefully effected. He is the son of King Frederick VIII of Denmark, and married Princess Maud, daughter of Edward VII of England.

Haarlem, a town in N. Holland. An important industry is the cultivation of bulbs. There are also breweries, textile factories, and printing works. Its most notable buildings are the Groote Kerk, the town hall, with its picture gallery and collection of Franz Hals' paintings, the Peyler Museum, and the meat market, which dates from 1602. Pop. (1932) 122,400.

Habakkuk, name of one of the books of the Old Testament classed as Minor Prophets. Various conjectures have been made as to the date of the prophecy, which is generally thought to have been written between 600 and 701 B.C. The book contains three chapters, the first and second (up to verse 4) forming a dialogue between Habakkuk and God, whilst the remainder of Chapter II outlines a judgment upon the Chaldeans.

H

psalm describing the might of Jehovah.

Habarovsk, *see* KHABAROVSK

Habdala (*lit.* "separation"), a brief Hebrew ceremony performed on the termination of Sabbaths and holy days to mark the distinction between days holy and profane.

Habeas Corpus, royal writ directing the gaoler or keeper of an imprisoned subject to *have the body* of that subject brought before the King's Court on a certain day. It was a prerogative writ issued in Norman times by virtue of the King's claim to supervise all justice in his realm, and soon came to be regarded as a right of the subject, its great value lying in the fact that it ensured prompt trial, and release, if the imprisonment was unjust. Under the Tudors the problem appeared whether the court could enquire into the cause of the imprisonment if it was shown that the imprisonment was by command of the King. The question came to a head under Charles I, and the Act of 1641, which abolished the Star Chamber (*qv*), provided that every subject should have the right to the habeas corpus.

In 1679, the Habeas Corpus Act was passed, providing that any person committed for any crime, except treason or felony, plainly expressed in the warrant of commitment, is to have the writ, and any judge to whom he applies for it must grant it. Furthermore, no person is to be sent to prison out of the kingdom. Heavy penalties were provided, but the Act was evaded by fixing excessive bails which the prisoners could not pay. Meanwhile it became established that the courts cannot investigate, even on a habeas corpus, the legality of a detention ordered by either House of Parliament for contempt. This is still the law, for the two Houses are the sole judges of

Habeas Corpus

what constitutes contempt against a House. Apart from that, the law was tightened up by a provision of the Bill of Rights (1689) that excessive bail ought not to be levied.

In 1816 the Habeas Corpus Act was extended to embrace cases of civil detention and provided for the issuing of the writ during vacations. When the person detained is produced the judge may either make no order or discharge the person detained, or award bail. The writ is fairly frequently applied for. It was used to free slaves at a time when slavery was lawful in England. In 1917 a certain German by birth who had been naturalised in England in 1903 concerning interned applied for the writ. In 1920 Art O'Brien who had been sent in custody to the Irish Free State was freed by habeas corpus directed to the Home Secretary.

Haber Fritz (b 1868) German chemist was educated at the University of Berlin and Heidelberg, and is well known for his researches on physical chemistry principally gas reactions. Haber's main achievement was the development of a method for the synthesis of ammonia (see 1) by the direct combination of hydrogen and nitrogen at high temperatures and pressures. This enabled Germany to be independent of Chilean sources of fixed nitrogen during the War of 1914-18. Awarded the Nobel (Chemistry) Prize 1918.

Haber Process, see AMMONIA. CATALYSIS. INDUSTRIAL APPLICATIONS OF.

Habitual Criminals. By an Act of 1867 any person who since he was 16 years old has been 3 times convicted of crime and is persistently leading a dishonest or criminal life or who has previously been charged as an habitual offender is deemed to be an habitual criminal. Should he have been sentenced to penal servitude he may receive an additional sentence of *preventive detention* (q.v.) of not more than 10 nor less than 5 years.

Habsburg (or *Hapburg*) name of a noble family of Austria-Hungary derived from a castle of the same

name on the Rar which was built in the 11th cent. when the ancestor of the family was born. One of the early Habsburgs was Rudolph I who became the German King in 1273 and also acquired Austria, Styria, Carinthia, and the Tyrol were later added to the possession of the family. On the death of Charles VI of Austria in 1740 his daughter Maria Theresa married Francis of Lorraine from whom the last Holy Roman Emperors known after 1806 as Emperors of Austria were descended. The Spanish branch of the Habsburgs died from the time of Charles V (see 1517) during which Spain was added to the Habsburg dominion. After Charles abdicated his son Philip became King of Spain. The Spanish line became extinct in 1700 after the death of Charles II when the throne passed to the Bourbons despite the attempts of the Austrian Habsburgs to claim it. The Habsburg-Lorraine line lasted until 1919 when the Habsburgs at that time represented by Charles I (born as Joseph) great-nephew were banished from Austria after the proclamation of the Republic. Charles I who died in 1922 married Zita Princess of Bourbon-Larme by whom he had 8 children of whom Francis Joseph Ott (b 1911) is the claimant to the throne of Austria and Hungary.

Hackberry a tree belonging to the elm family native of America 60-80 ft high with ovate long-pointed leaves and an oblong fruit $\frac{1}{2}$ in long which is purple when ripe and edible.

Hackney metropolitan borough of N London including the districts of Dalston Clapton Harington and part of Haringland. It contains Hackney Marshes and parts of Hackney Common and Victoria Park Pop. 215,330.

Hackney medium-sized horse of about 15 hand used for ordinary hacking or driving. A *Hackney Carriage* is a horsed vehicle plying for hire.

Haddington, see FAST IDOTHIAN.
Haddock, an edible sea fish resembling

bling and related to the whiting, but typically larger. It is usually cured by smoking.

Haddon Hall, ancient mansion in Derbyshire, England, c. 2 m. S.E. of Bakewell. From the Norman family of Peveril it passed to the Avenells and, in the 12th cent., to the Vernons. It is associated with the legend of the elopement of Dorothy Vernon with Sir John Manners, the theme of many works of fiction and of Sullivan's opera, *Haddon Hall*. It is partly described as Martindale Hall, in Scott's *Peveril of the Peak*.

Hades [HĀ'DĒZ], in classical mythology, the lower world, to which went the spirits of the dead. Its king was, in Greek Hades, in Latin Pluto, and its Queen Persephone or Proserpine. To reach it, the souls had to cross the R. Styx in the boat of Charon (*qv*), and the rivers Acheron, Phlegethon, and Cocytus. In Hades they were judged by Rhadamanthus, Æacus, and Minos, and consigned either to the Furies (*qv*) or the Elysian Fields (*qv*). The entrance to Hades was guarded by Cerberus (*qv*). Among the heroes who visited Hades for various purposes and returned to the upper regions were Æneas, Ulysses, Orpheus, and Hercules.

Hadhramaut, a province of S. Arabia, on the Gulf of Aden and the Arabian Sea. Tobacco and aloes are produced, and carpets, shawls, and frankincense manufactured. Its capital and port is Makalla. The chiefs enjoy protection from Great Britain. Pop. c. 150,500.

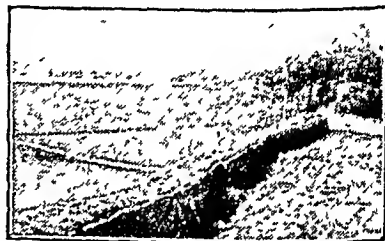
Hadj, see *Hajj*.

Hadow, Sir William Henry (b. 1859), English musician, principally known for his writings on music, e.g. *Studies in Modern Music* (1894-6), rather than for his actual compositions which comprise Church and chamber music and songs. Knighted, 1918.

Hadrian (PUBLIUS ÆLIUS HADRIANUS) (76-138), Roman emperor. He had a distinguished military career before succeeding Trajan as emperor (A.D. 117), after which he began his famous

travels throughout the empire. He visited Britain (122), when he built the wall from the Tyne to the Solway, which is known by his name. He rebuilt Jerusalem as Ælia Capitolina. Hadrian was a remarkably competent administrator, instituting many notable reforms in the provinces and Italy itself, besides being a cultured patron of art, literature, and architecture. He twice visited Athens, where he completed the Olympium and dedicated many new buildings.

Hadrian's Wall, a Roman fortification of which some remains still exist, extending across N. England from Bowness, on the Solway, to Wallsend, at the mouth of the Tyne, close to Newcastle. Its length is 75 m. The wall, often known simply as the



Hadrian's Wall, Northumberland

Roman Wall, was 20 ft. high and 8 ft. thick, at mile intervals it was provided with towers known as "mile-castles." Its construction is attributed to Hadrian (A.D. 120). Parallel to the S., at a varying distance, extends a continuous series of earthworks, known as the *Vallum*.

Haeckel, Ernst Heinrich (1834-1919), German biologist, Professor of Zoology at Jena, made a great reputation as an upholder of the doctrine of evolution and a supporter of Darwin's Theory. In this respect he might be described as the German Huxley. Among his better-known works are *General Morphology of Organisms*, 1866, *The Last Link*, 1898, and *The Riddle of the Universe*, 1899.

Hæmatite, also known as Kidney Ore and Specular Iron-ore, is red oxide

of iron though the crystalline form the specular iron-ore is steel grey to black in colour except when thin enough to transmit light. Hematite crystals are in hexagonal often thin and tabular crystals with metallic lustre but usually is found massive in kidney-like lumps with metallic lustre or as a dull earthy variety known as Reddle. It often contains impurities such as sand and clay or sometimes water. Hematite occurs in pockets and hollows replacing limestone as at Ulverston in N. Lancs. where the hematite is probably derived from the iron-bearing Triassic sandstones overlying the limestone. A similar origin is claimed for the deposits in the Forest of Dean, Cumberland, Spain, Utah and elsewhere. Hematite is an important ore of iron and in the United States yields 9% per cent of that country's iron supply. On account of its red colour it is used by the N. American Indians for war paint. It often colours beds of rock red over large areas and in small quantities is responsible for the red colour in rubies, garnets etc.

Haemocyanin, blue pigment of great physiological importance which occurs in the blood of certain invertebrate animals. Its biological function corresponds to that of hemoglobin (qv) in the higher animals but contains copper as the metallic element in place of the iron which is found in hemoglobin. In the oxidised state haemocyanin is blue whilst in the reduced condition it is colourless. Its chemical structure is as far as is known quite different from that of hemoglobin; there is no pyrrole group present; the copper apparently uniting directly with a protein. See also COPPER.

Hemoglobin, the red pigment present in the blood of man and other animals functioning as an oxygen carrier undergoing successive oxidations and reductions. Hemoglobin itself is a reduced compound of purple-red colour (venous blood) being converted on oxidation into oxy-hemoglobin, a bright red com-

pound (arterial blood). Oxy-hemoglobin can be split up into two portions: the coloured compound oxy-hematin containing iron with the formula $C_{14}H_{12}N_4O_4FeOH$ and an albuminous protein globin. The constitution of oxy-hematin is not known although the principal constituent groups have been identified; the substance itself is probably built up from condensed pyrrole nuclei. Almost nothing is known as to the structure of the protein globin; it is however certain that this varies with different animals with the result that the term hemoglobin is more accurately applied to a group of substances than to any one particular compound. In addition to combining with oxygen the hemoglobins also combine with carbon monoxide forming carboxy-hemoglobin. The stability of this compound as compared with oxy-hemoglobin accounts for the highly toxic properties of carbon monoxide since it monopolises the hemoglobin of the body and thus inhibits oxygenation of the blood. See also BLOOD.

Hemophilia, see BLOOD GENETICS.

Hemorrhage, see BLOOD.

Hafiz, pseudonym of Khwaja Shamsuddin Mohammed (c. 1300-c. 1350), Persian lyric poet. He lived and lectured mostly in Shiraz. His best known work is the *Diwan*, a collection of short poems called *ghazals*. These deal mostly with wine, women and song and are written in a charming and natural style. Several translations into English exist.

Hafnium (or *Celthum*), metallic element of recent discovery. Found in zirconium ores in 1913 it is a relatively common substance having escaped earlier detection owing to its great similarity with zirconium (qv). The pure metal may be obtained by the reduction of the tetrachloride with sodium. Hafnium has been suggested for use in the manufacture of lamp and wireless valve filaments. For its characteristics see ELEMENTS.

Hagen, Walter (b. 1894), champion golfer. He won the U.S.A. Open

Championship in 1911 and 1919, and the British Open Championship in 1922, 1924, 1928 and 1929. He also won in 1924 the Belgian Open and the U.S.A. professional championships.

Hagenbeck, Carl (1844-1913), animal dealer and showman, who founded in 1897 the famous zoological gardens at Stellingen, near Hamburg where animals were exhibited under natural conditions in the open.

Hag-fish is not a true fish, but forms with the lamprey (*q.v.*) a special class of vertebrated animals (*see* *FISHES*). It lives in the sea, and has a long worm-like body, a slimy skin and almost functionless eyes. It feeds upon fishes even of large size, by boring its way into the body cavity by means of its rasping tongue and devouring the internal organs.

Haggadah (or *Passover Haggadah*), the ritual of the beautiful family service, celebrated in Jewish houses on Passover Eve in commemoration of the Exodus from Egypt. It is a compilation of joyous songs, prayers, and historic narrative, in Hebrew. HAGGADAH (or *Agudah*), is derived from a Hebrew verb meaning 'to narrate' or explain. It is the lighter side of Talmudic and Rabbinical literature, in contradistinction to Halakha (*q.v.*), the legalistic portion. It comprises homilies, narratives, and legends, used to explain or expand Biblical narrative.

Haggai, prophet whose writings are contained in a book in the Old Testament which bears his name. His prophecies occupy the tenth place among the Minor Prophets. His book comprises four prophecies delivered on three occasions, inspired through the delay in the reconstruction of the Temple. In 520 B.C. he exhorted that this work should be begun, with the result that the Temple was completed in 4 years. Haggai's fourth prophecy (ii 20-23) refers to the blessings of the Lord on Zerubbabel. Little is known of the prophet, save that he was probably born in Babylon, and died in

Jerusalem. He was associated with Zechariah.

Haggard, Sir Henry Rider (1856-1925), English novelist. His most popular works are *Dawn* (1884), *The Witch's Head* (1885), *King Solomon's Mines* (1886), *She* (1887), and *Alla Quartermain* (1888). He also published works on agriculture, e.g. *Rural England* (1902) and *The Poor and the Land* (1907). The scene of some of his most successful novels is laid in Africa.

where as a young man he was on the staff of Sir Theophilus Shepstone at the first annexation of the Transvaal.

Haggis, a Scots dish consisting of sheep's heart, liver, and tongue minced and mixed with oatmeal, suet, onions, and seasoning. The mixture is placed in a sheep's paunch and boiled slowly for 2-3 hours. It is served from a small hole cut in the skin.

Hagiology, a branch of history concerned with the critical study of the lives of the Christian saints.

Hagioscope, name derived from two Greek words meaning "holy" and "to see," given to small windows in the walls of churches, either internal or external, so placed that people, either outside the church or in the side aisle, could see the Elevation of the Host at the high altar.

Hague, The (Dutch, 's Gravenhage), capital of the Netherlands, c. 2 m. from the N. Sea at Scheveningen. The seat of the Dutch Government and residence of the Court and diplomatic corps, it is also an important industrial town. There are copper- and lead-smelting furnaces, iron- and printing works, distilleries, furniture factories, and carriage body building works. Among its public buildings are the Mauritshuis (1633) which contains a valuable collection of pictures, and the Binnenhof, which still retains the spirit of antiquity, and is the real centre of The Hague. 11 buildings grouped round the square or inner court are the Hall of the Knights, the courts of justice, and the halls used by the two chambers forming the States-General when in session.

Of the remaining buildings of note the town hall typically Dutch in style (1565) and the royal palace are the finest examples. The Nieuwe Herk contains the tombs of the brothers De Witt who were killed by the mob in 1672 and of Spinoza. Towards the N.E. of the town are the zoological gardens and the Haagsche Bosch a beautiful park containing a royal villa of ancient date in which the first International Peace Conference met in 1899. There is also the Carnegie Palace of Peace (1913) the seat of the International Court of Arbitration. The Hague is also the seat of the Permanent Court of International Justice created in 1920.



The Palace of Peace, The Hague

For many years the Hague was the important centre of European diplomacy and from 1688 to 1907 several treaties were concluded here. Pop. (1932) 449,614.

Hague Conferences, two peace conferences held at the instance of the Tsar of Russia in 1899 and 1907. Their primary object was to check the race in armaments which was then alarming far sighted people. None of the Great Powers was ready to put a stop to its armament programmes and while these conferences served to show that a problem existed they gave no guide to its solution.

The conferences were more successful with the question of arbitration. In 1899 an international judiciary was established with provision for an

investigation into disputed facts and a permanent method of appointing arbitral tribunals was arranged. The convention of 1907 was adhered to by most countries including Great Britain. The conferences also dealt with many points of international law of war put forward with the enterprising object of making war more humane. In spite of their failure over the main problem of disarmament the conferences were a step towards the evolution of the League of Nations and its subsidiary organisations and they foreshadowed the Court of International Justice.

Hahnemann Samuel Christian Friedrich (1755-1843) German physician. In 1790 he noticed that quinine could both cause and cure the same symptoms and formulated the Law of Similars which states that disease should be treated by drugs that produce in the healthy symptoms similar to those caused by the malady to be cured. Further he stated that drugs would be effective in very small doses and named his system homoeopathy. A statue was erected to him in Leipzig.

Hyderabad, see HYDERABAD

Haifa, port and city on the Bay of Acre at extreme N. of Palestine (pop. c. 50,600). The city has undergone rapid development at the hands of the Jewish settlers who have come to Palestine since 1918. New industries—flour-milling, cement and soap manufacture—have been introduced and an entirely new Jewish section of the city has been built on the neighbouring slopes of Mount Carmel. Arab riots occurred in Oct. 1933 as a protest against Jewish immigration.

A large harbour was completed in Oct. 1933 thus investing the city with possibilities which may well make it one of the most important Mediterranean ports within a few years. It is one of the Mediterranean termini of the oil pipe-line from Mesopotamia as well as an important railway junction connecting it with the Hedjaz railway and the Palestine railway.

system A railway from the port across the Syrian desert to Mesopotamia, which has been projected, promises to make it a great central port for traffic to S Asia Haifa is one of the holy cities of the Baha'i faith, and the burial-place of its founder and his successor

Haig, Douglas Haig, 1st Earl (1861-1928), born in Edinburgh and educated at Clifton and Oxford He joined the 7th Hussars (1885) and after passing through the Staff College he was



Earl Haig

attached to the Egyptian Army during the Nile campaign (1898) He took part in the S African War (1899-1902, was promoted Lieut-Colonel and awarded the C B He was in India (1903-6 and 1909-11), the second time as Chief of the General Staff By 1912 he was in command at Aldershot, and on the outbreak of the World War he headed the 1st Army Corps, succeeding French as Commander-in-Chief in 1915 He remained in command of the British Army until the end of the War, and planned the final attack which drove

the Germans back and preceded the Armistice His great services were later recognised by the award of the Order of Merit and a peerage The admiration accorded him by soldiers during active service remained undiminished in post-War years, as a result of his interest in the welfare of ex-service men He was founder and President of the British Legion, and instituted *Poppy Day* He was buried in Dryburgh Abbey, Scotland, near his ancestral home at Bemersyde, which had been acquired by public subscription after the War and presented to him, together with a Parliamentary grant of £100,000

Hak, Arab garment of hand-woven woollen cloth worn as a cloak, concealing the body from head to foot Also used by women to hide the face

Hail is frozen rain Two kinds occur, true hail and soft hail The latter is typical of winter, and takes the form of showers of tightly packed ice crystals forming a mass up to the size of a pea, which crumbles on striking a hard surface It is formed by the larger ice particles in a cloud adhering to the smaller ones, which they overtake in their descent to the earth True hail is a warm-weather phenomenon, often occurring in thunderstorms A rising current of air carries raindrops up into the colder regions of the atmosphere where they freeze and fall back into the cloud from which they arose and receive a further deposit of frozen water The same hailstones may be caught in ascending and descending currents several times in succession until they grow to a fair size, and masses of over 1 lb in weight are formed on rare occasions

Haile Selassie I (b 1891), Emperor of Abyssinia (crowned 1930), was known previously as Ras Tafari Makonnen He deposed Lij Yasu, a dissipated acquisitive ruler He is friendly with the European nations, is a keen social reformer, and is gradually trying to abolish slavery in Abyssinia, although it still flourishes in outlying areas of that country He has abolished

many cruel laws and methods of punishment and has himself printed part of the Scriptures and other Christian literature in the native tongue

Hailsham, Douglas McGarel Hogg 1st Viscount (b 187^o) English politician and lawyer son of Quintin Hogg the founder of the London Polytechnic After 8 years of commercial work in the W Indies he studied law was called to the bar (190^o) and became a KC (1917) He entered Parliament (19



Viscount Hailsham

as Conservative and served two terms of office as Attorney-General (1914-1919) He became a baron and Lord Chancellor (1928) and Secretary of State for War (1931) Created Viscount in 1929 he was Leader of the Opposition in the House of Lords in 1930-31 A keen cricketer he was elected President of the MCC in 1933

Hainan an island belonging to the province of Kwangtung in S China Sea, and Gulf of Tonking Rice is the main crop Mahogany and rosewood are the chief forest products The island is subject to occasional

seismic disturbances and typhoons The capital is Kiang-chow Area c 1300 sq m pop c 250 000

Hai Phong port of French Indo-China on a branch of the Red River delta Its main industries are oil soap and cotton thread pop c 90 000

Hair a term commonly applied to the external covering of the Mammalia and also of such insects as bumble bees but properly applicable only to the former Hairs in this sense are characteristic of Mammals and serve to distinguish them from Bird and Reptiles They are typically long thread like modifications of the epidermis or outer skin and are sunk in deep pits or follicles lined with epidermis which sink into the under skin or dermis The root is bulbous and surrounds a vascular process of the dermis called the papilla The shaft of the hair consists of an axis of pith containing air-cells and of a horny external part which has no cells

Many mammals have hairs of two kinds the ordinary hairs just described and a much finer softer hair usually concealed by the former and called underfur down or wool Soft hair is called fur coarse flexible hair bristles and coarse almost inflexible bristles are spines Hairs or bristles are never wholly absent in mammals except in most whales but some of these especially when young have a few on the hips For the care of human hair see COSMETICS

Haiti (1) An alternative name for the island of Santo Domingo (qv) in the Greater Antilles W Indies (2) *République de Haïti* a republic on the W side of S n Domingo occupying one-third of that island and bounded on the E by the Dominican Republic The surface is mountainous and subject to violent earthquakes. The lands are fertile producing coffee cotton tobacco and sugar Lumber from the mountain forests is of considerable value Copper is known to exist but minerals have not been developed The inhabitants are

mainly Negroes and Creoles. Roman Catholicism is the official religion. French usually in Creole dialect, is the main language. Largest towns are Port au Prince, the capital (79 800), Cap Haïtien (22 000), Aux Cayes and Jacmel (12 000), and Gonâves (10,000). Area, 10,200 sq m, pop c 2,500,000 (c 3000 whites).

Government Under the present constitution (ratified 1932), the President is head of the administration and there is an elective legislature consisting of a Senate and a Chamber of Deputies. Since 1915 the U.S.A. has, by a treaty expiring in 1936, undertaken to assist in establishing a stable and efficient government. Most of the important administrative posts were, until 1931, occupied by Americans, who still control the finances and the police.

History In 1492 Columbus discovered Haiti. In 1677 a French colony was established in the W. of the island, but was overthrown by Toussaint l'Ouverture in 1791. The colony was declared independent in 1804. Revolutions have been frequent: seven presidents held office between 1910 and 1915. Disorders reached their climax with a massacre on July 26, 1915, followed by the brutal murder of the President. Armed forces of the U.S.A. restored order.

Hajj (Arabic *hadj* = *setting out*), name of the pilgrimage of the Mohammedans to Mecca, which must be made by every Moslem at least once in a lifetime. There are many rules and ceremonies to be observed. The pilgrim must repent of his sins, pay his debts, and read certain verses from the Koran before setting out. After the pilgrim has entered the holy mosque at Mecca, he has to perform special rites, which include walking seven times round the Ka'aba, or sacred black stone.

Hake, an edible sea-fish, allied to the cod, but of slenderer build, although it may reach 2 or 3 ft in length. Large numbers are sometimes taken on the Cornish coast, which they visit to feed on pilewards.

Hakluyt, Richard (c. 1552-1616), English geographer, his famous *Discovers Voyages touching the Discovery of America* (1582) and *Principal Navigations, Voyages and Discoveries of the English Nation* (1589) had a wide influence and were greatly popular. The Hakluyt Society (founded 1846) has reprinted his books, as well as printing other rare books of travel and exploration.

Hakodate, town and port at S. extremity of the island of Hokkaido, Japan. There is a large match factory in the town, and the population of the coast are engaged in the fishing industry. Cereals, furs, smoked fish, sulphur, and timber are exported. The harbour is large, deep, and safe. Pop 107,252.

Halakha, the legal portion of Jewish tradition, in contradistinction to Haggadah (*q.v.*), the Jewish Civil Law, and the laws governing ritual practice, customs, etc.

Halberd, a weapon used during the 15th and 16th cents. It consisted of a combined spear and axe-blade mounted upon a 5½-6 ft. wooden staff. Originating in Germany, the weapon was adopted by the Swedes, Swiss, French, and English successively. It is still carried by the Yeomen of the Guard on ceremonial occasions.

Halberstadt, town in Saxony, Germany, about 37 m S.E. of Brunswick. Sugar, machinery, paper, and leather goods are manufactured. It is an ancient town, noted for its 15th and 16th-cent wood-architecture, the finest specimens being found in the market. Pop c 49,130.

Halecyone [HALSI'ŌNF], in classical mythology, the daughter of Æolus. Her husband, Ceyx, was drowned and when she found his body on the shore she cast herself into the sea and both she and Ceyx were turned into birds. These birds (halecyons) build their nests upon the water when it is calm, hence "halecyon days" are days of peace and serenity.

Haldane, Elizabeth Sanderson (1862), English authoress, has held man

important positions in public life and was the first Scottish woman justice of the peace. Her works include studies of the philosophers and a life of George Eliot. She is the sister of Lord Haldane.

Haldane, John Burdon Sanderson (b 1857) British biologist. He was Sir William Dunn Reader in Biochemistry in Cambridge University from 1922 to 1932 and has been head of the Genetical Department at the John Innes Horticultural Institution since 1927. He is now with Prof D M S Watson joint Professor of Zoology at University College London. He was elected FRS in 1937. He has published many scientific papers on physiology and genetics and several books including *Darwinism* (1944), *Possible Worlds* (1947), *Enzymes* (1930), *The Causes of Evolution* (1931).

Haldane, Richard Burdon, 1st Viscount (1836-1908) British statesman and philosopher born in Edinburgh and educated there and at Göttingen. He was called to the bar (1859), became QC (1890). He was Liberal MP for Haddingtonshire (1885-1911). As Secretary of State for War in Campbell-Bannerman's Cabinet (1903) he reorganised the Army, instituted the

Territorial system and virtually created the Expeditionary Force which so completely justified its existence in 1914. His sympathy with and admiration for Germany and the Germans fitted him to be delegate to that country in 1906 and 1912 when he was sent on missions which aimed at the abolition of a mutually suspicious attitude. He was Lord Chancellor 1912-15 when he was left out of the first Coalition—treatment described by Mr Lloyd George in his *War Memoirs* as a mean betrayal. In 1915 he was appointed to the Order of Merit. In 1914 he became Lord Chancellor in the first Labour Government. His writings include *The Reign of Relativity* (1911), *The Philosophy of Humanism* (1929) and his *Autobiography* (1939).

Hale, Sir Matthew (1600-1666) English jurist. He became judge in the Court of Common Pleas 1653 and was a member of Cromwell's Parliament 1655. Appointed Chief Baron of the Exchequer 1660 and Lord Chief Justice 1671. He wrote *History of the Pleas of the Crown*, *Common Law of England*, *Contemplations* and some poems.

Halévy Jacques François Fromental Élie (19 July 1802) French composer of operas of which the best known is *La Juive*. He studied at the Paris Conservatoire under Cherubini and won the Prix de Rome 1819. Wrote many operas including a setting of *Manon Lescaut*, all of which show excellent dramatic sense and musicianship.

Halévy Ludovic (1824-1908) French dramatist. His first famous work was *Orphée aux Enfers* with music by Offenbach. In 1860 he met Henri Meilhac and they became well known for their collaborative successes many of which were set by Offenbach. Among them were *La Belle Hélène* (1864), *La Grande Duchesse de Gérolstein* (1867) and *La Tétrachord* (1868). *Froufrou* (1869) a serious play. *Les Sonnettes* and *Toto chez Tata* are other



Lord Haldane

successes of theirs Halevy's novel, *L'Abbe Constantin* (1882), was very popular

Half-timbered (architecture), having walls made of a timber frame, with interstices filled with other material, such as lath-and-plaster, brick, etc. Buildings in this style were known at the end of the Romanesque period, but it was not till the 15th and 16th cent that they became common. In England they belong mainly to the Tudor period.

In the later examples of this style the woodwork often interlaced, and beams and brackets were richly carved and decorated. The upper stories frequently project, as at Staple Inn, Holborn. Other examples are Moreton Old Hall, Cheshire (1540), and Speke Hall, Lancashire (1598). The contrast between the dark beams and the light-coloured filling has earned for some examples the name of Black-and-White. The style is much copied by modern architects, the timber showing on the outside of the houses often being a sham, without structural significance.

Half-tone Process, see PHOTO ENGRAVING

Halibut (*Hippoglossus vulgaris*), one of the marine edible flat fishes related to the plaice, but not so broad.

Halibut Liver Oil, obtained by steaming the livers of the halibut or flounder. It is the most active known source of Vitamin A, and is now produced on a commercial scale as a rival, for medicinal purposes, to cod-liver oil. The Vitamin D content of the oil is not exceptional, but in many commercial preparations is increased by the addition of ergosterol followed by irradiation with ultra-violet light to bring the anti-rachitic activity of the oil up to standard.

Apart from its high content of Vitamin A, halibut liver oil is very similar to the liver oils from other Teleostei fish.

Halicarnassus, ancient city of Caria, Asia Minor, on the Gulf of Cos, originally called Zephyria, and famous as the

birthplace of Herodotus, 484 B.C. After the Peace of Antalcidas in 387 B.C. (see GREEK HISTORY) Halicarnassus passed under the sway of Persia, and the satrap Mausolus raised it to its greatest peak of prosperity. In 353 B.C. Mausolus's widow Artemisia built the Mausoleum, one of the Seven Wonders of the World. The statue of Mausolus and many fragments from the tomb are in the British Museum. Halicarnassus was originally the home of the Greek historian Dionysius of Halicarnassus (1st cent. A.D.). The site of the city is now occupied by the town of Budrum.

Halidon Hill, Battle of (Scottish Wars) (July 19, 1333). The English under Edward III, John of Eltham, and Edward Balliol inflicted a crushing defeat on the Scots under the Regent, Sir Archibald Douglas, 30,000 Scots were slain, including Douglas and 6 earls, while the English losses were trifling.

Halifax, county borough in the W. Riding of Yorkshire, at the confluence of the rivers Hebble and Calder. Halifax is a centre of the woollen industry and it ranks second only to Bradford for worsteds. Pop. (1931) 98,122.

Halifax, city and seaport of Nova Scotia, Canada. Its harbour is spacious, and open the entire year. There are large foundries, furniture works, boot and shoe manufactures, and trade in fish, fruit, and agricultural produce. Dalhousie University (1818) is situated here. Pop. (1931) 59,275.

Halifax, Charles Lindley Wood, 2nd Viscount (b. 1839), former President of the English Church Union, founded in 1860 mainly to uphold High Church doctrine. Father of Lord Irwin (Viceroy of India, 1924-31).

Halifax, Charles Montague, 1st Earl of (1661-1716), English poet and finance minister, was 3 times First Lord of the Treasury (1692, 1697, and 1714), Chancellor (1694), and Auditor (1694) of the Exchequer. He founded the National Debt in 1692, proposed the incorporation of the Bank of England

in 1694 and introduced the Recoinage Bill in 1695. As a poet he is known for his *Country Mouse and Town Mouse* (1687) a satire on Dryden's *Hind and the Panther* which Halifax wrote in collaboration with Matthew Prior.

Halifax, George Savile Marquess of (1633-1694) English statesman. He vehemently opposed the Exclusion Bill of 1680 by which the Protestants sought to prevent James Duke of York from succeeding to the throne but ranged himself with popular opinion during the trial of the bishops (1688). He was made Viscount 1688, Earl 1679 and Marquess 1687. His consistent policy of moderation as opposed to extremist views earned him the epithet of *Trimmer* which he used in the title of his political work *The Character of a Trimmer* (1688).

Hall (1) Originally the great apartment of a medieval dwelling in which most of the social occupations of life were carried on such as eating and merry making. (2) The whole dwelling including the various rooms clustered round the great apartment. (3) Now the large room in a castle, palace or mansion chiefly used for dining e.g. *banqueting hall*. (4) The large dining room in a college or school also (at Oxford) the evening meal taken there. (5) In the phrase *servants' hall* dining and sitting room for servants in a private house. (6) Principal house in a country district with or without a topographical epithet e.g. *The Hall Speke Hall*. The name survives even after a house may have been turned into a hotel, school or institution etc. (7) In N. England, a farm house e.g. *Yeabarrow Hall Long Siddale*. (8) Large building used for public philanthropic or social purposes e.g. *Town Hall Hall of Justice Mission Hall* etc. (9) Building in which certain members of a university graduate and undergraduate reside e.g. *St Edmund Hall Oxford Trinity Hall Cambridge*. These university

Halls possess halls in the sense of (4) above. (10) Headquarters of a learned or professional society, trade guild etc. e.g. *Surgeons' Hall Fishmongers' Hall*. (11) Portion of a public or private building situated either directly behind the front door or just beyond an entrance vestibule. Hotels and large houses often have a *lounge hall*. In small houses the hall (in this sense) is often a mere passageway (1) In the U.S.A. passageway or landing not necessarily on the ground floor.

The medieval hall had a central hearth the smoke of which escaped through the lantern in the open roof. A notable example is the hall of Penshurst Place Kent (1340). The Tudor or Elizabethan hall was important (see *ELIZABETHAN STYLE*). The hammerbeam roof (qv) is a feature of this style exemplified at the Middle Temple London (1570). Outstanding college halls are those at Christchurch Oxford (159) and Trinity College Cambridge (1609).

Hall, Joseph (154-1656) the first English satirist according to his own claim. His best known and first satire was *Largidemarium* (1597). He was made Bishop of Exeter in 1617 and was translated to Norwich in 1611. He published several theological works that offended the Puritans. Controversies arose in which Milton took part and Hall was imprisoned by the Long Parliament.

Hall, Radclyffe English authoress. Her works include poems and lyrics many of which have been set to music notably *The Blind Ploughman* and many novels e.g. *The Forge*, *The Unlit Lamp*, *Adam's Breed* (*Femina Vie-Hicreus*, Price 10-6), *The Hell of Loneliness* (10-6) and *The Master of the House* (193).

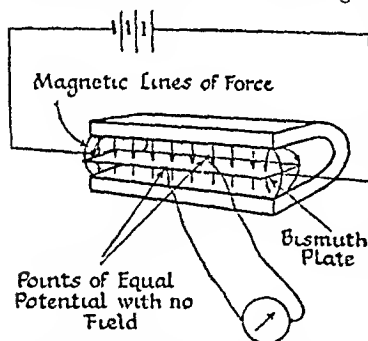
Hallam, Henry (1777-1859) English historian noted for his detailed research into original documents. He published his first work *A View of the State of Europe during the Middle Ages* in 1818. His best known work is *The Constitutional History of England*.

from the Accession of Henry VII to the Death of George II (1827) His son, Arthur Henry Hallam (1811-33), was a friend of Tennyson, who honoured his death in *In Memoriam*

Halle [HALŮ] town in Saxony, Germany, on the R Saale, W of Leipzig The chief and oldest industry is salt production, other manufactures are starch, sugar, paraffin and agricultural machinery In the Middle Ages it was a flourishing Hansa town The university dates from 1694 Handel was born here and a bronze statue of him stands near the Rathaus Pop 208,000

Hallé, Sir Charles (1819-1895), one of the best-known pianists of his time, and conductor of the "Hallé Orchestra" of Manchester, which he founded Was a friend of Chopin, Liszt, and Berlioz In 1888 he married Madame Norman-Neruda, the violinist

Hall Effect If an electric current is passed through a strip of metal, two points can be found on either side of the strip which are at an equal potential, so that no current flows through a sensitive instrument connected to them If, now, the strip is exposed to a magnetic field at right angles to the plane of the strip, a current is found to flow from the two points originally of equal potential, this current being reversed in direction when the magne-



tic field is reversed This is only one of several such effects, in which the

electrical and magnetic properties of a solid are modified by magnetic field, and also by the flow of heat These effects, which are exhibited in very different degree by different metals, bismuth and tellurium being among the most prominent, are mainly of theoretical interest, they are known by the names of their discoverers, Ettinghausen, Righi, Leduc, Nernst, and Thomson The increase of electrical resistance produced in bismuth by a magnetic field is closely related to the Hall effect, and is employed by electrical engineers to measure magnetic fields The whole problem is far from being understood theoretically, though in a general way it can be shown that such effects must occur

Hallefinta, a compact fine-textured acid rock composed of a mixture of microscopic particles of felspar and quartz, with traces of ferro-magnesian minerals, cemented together by secondary silica

It is very variable in colour, and probably includes rocks of widely different origin, such as felsitic lavas and metamorphosed sediments Hallefintas are found in the St David's district and in Charnwood Forest in Leicestershire

Halley, Edmund (1656-1742), English astronomer Before he was 20 he contributed a paper to the Royal Society, later he travelled to St Helena, where he made important astronomical observations, and on his return home presented to the King a planisphere of the S constellations, for which he was rewarded with an honorary MA

In 1680 he observed the great comet which has subsequently borne his name Halley urged Newton (*qv*) to the production of the *Principia*, and paid for its publication In 1698 he obtained from William III the command of a sloop of war to study the variations of the compass and reached as far south as Lat 52°, but he was soon forced by a refractory crew to return Nothing daunted, he set forth again, penetrating to where

he fell in with great islands of ice of so incredible a height and magnitude that he scarce dare write what he thought of it. After some more exploration he returned home in 1603 was appointed Savilian Professor of Geometry at Oxford and later Astronomer Royal.

Hall marks the markings required by law to be stamped on gold and silver plate above a set standard. The minimum for gold plate has been reduced from 18 carat to plate containing one third of fine gold and silver plate must contain 11 oz 2 dwt per lb weight troy. The hall marks are (1) initials of the worker or maker (2) mark of the assay town (3) a variable letter denoting the year of manufacture (4) gold plate above 18 carats must bear the standard mark a crown and the carat value in figures and silver must bear the standard mark of Britannia and a lion passant. The hall marking of foreign plate made later than 1800 is compulsory if imported into Britain.

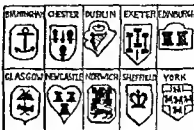
Hallows on the eve of All Saints Day (q.v.). It is more associated with ancient superstitions than with the Christian feast from which it takes its name. It was a Druidical festival and mainly noted for the belief that ghosts and witches were about at this time. Such superstitions and the lighting of bonfires on this night still survive.

Hallucination, an error in perception affecting some sense organ to an extent sufficient to produce an impression of something which is not existent. It differs from illusion which is the wrong interpretation of something real. The commonest hallucinations are images produced mentally without the action of the eye which become so vivid that the person is persuaded that he actually sees the object. Hallucination and illusion may occur in sane people and more commonly when there is slight mental derangement due to overwork, sleeplessness, feverishness or other causes.

SILVER HALL MARKS



Six different Period

Col. I. Art. E. art. T. w. ppear. 8
If it mark

Typical Hall-marks.

Generally however they are symptoms of insanity (q.v.).

Halma (Gr. a leaping) a game for

2 or 4 players played on a board with 256 squares. Two players use 10 "men" each. 4 players have 12. The "men" resemble small chess-pieces. The 12 are coloured black, white, red and green respectively. The men are arranged in cards at opposite corners of the board, and each player tries to remove his men from his own yard into those of his opponents. The men move en passant at a time in any direction straight or diagonally, and may "jump" over any piece having a vacant square beyond it, but such pieces are not removed as in draught. Any number of pieces may be jumped at one move, provided that there is a vacant square behind each.

Halo, the bright ring round the heads of saints in Christian art. Originally reserved for Christ and the angels by the end of the 4th cent. it was used for the Virgin Mary and the Apostles. It was later applied to all saints.

Halogens, name applied to a group of non-metallic elements all possessing similar chemical properties. The group consists of fluorine, chlorine, bromine, iodine, and the element of atomic number 85 whose identity is as yet doubtful and for which the name alabamine has been suggested. All these elements possess considerable chemical reactivity and they form compounds of a similar type. They are described under their individual headings.

Halophytes, general name given to plants which can grow in salty ground, although strictly it applies to those species found only in salt places. Thrift, for instance, is found on mountain tops and on rocks as close to the sea as it can get root space. Wallflowers and stocks, which are garden flowers, can also germinate in salty places. True halophytes have fleshy leaves, containing a liquid, and thickened stems, characteristics which are acquired by ordinary plants when growing in salty ground. As a general rule halophytes bear insignificant

flowers, an exception being *Salicornia*.

Haloxax, proprietary name for a chloro-paraffin, a most powerful solvent. It is used as a substitute of ethyl alcohol.

Hals, Franz (c. 1680-1760), Dan. painter, was born at Arhus, where he is believed to have studied at Kuber's under van Noort. He later worked in Berlin under Mander at Haidrich, and here the remainder of his life was spent. He is known as a portrait



The Laughing Cavalier, by Hals.

printer is world-wide; he painted all classes of society, and his work is remarkable for its quickness and facility, its technical freedom and directness, and the skill with which he caught and registered fleeting expressions, particularly those of amusement and mirth. For the greater part of his life, Hals appears to have kept his large family in comfortable circumstances, but in 1652 all his possessions were sold to satisfy his creditors, and his old age was a struggle against poverty and destitution.

He produced a large number of paintings, which include many portrait groups, such as the *Banquet of the Officers of the Arquebusiers of St*

George and Regents of the Company of St Elisabeth Examples of his work hang in the public galleries of Europe especially at Haarlem there are 5 in the National Gallery and one the *Laughing Cavalier* in the Wallace Collection

Halsbury *Hardinge Stanley Giffard*, 1st Earl of (1823-1921) British statesman Solicitor General 1858-60 and Lord Chancellor 1885-92 and 1895-1905 He was a brilliant criminal lawyer engaged in the Tichborne case among other *causes célèbres* He edited an important alphabetical compilation of *The Laws of England* (31 vols 1907-17)

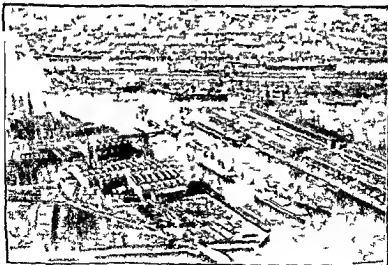
Halsey *Sir Lionel* (b 187) British admiral Joined the Navy (1895) and took part in the defence of Ladysmith (1899) As captain in command of H.M.S. *New Zealand* he participated in the battle of Heligoland (1914) and the Dogger Bank (1915) At Jutland he served in H.M.S. *Iron Duke* as Commodore and Captain of the Fleet From 1917 to 1918 was Third Sea Lord and was Chief of Staff to the

Prince of Wales during his several tours abroad He was appointed Comptroller and Treasurer to the Prince of Wales in 1920

Hamadryad, another name for the *king cobra* (see COBRA)

Hamasa [HUMASU] anthology of Arabian poetry from the earliest period to c AD 830 compiled by Abu Tanimam Apart from the remarkably high level of its poetic merit the book is of great value as a record of old legends It has been translated into German verse and portions of it into English verse by Sir Charles Lyall (1885)

Hambourg *Mark* (b 1879) pianist born in S Russia studied under Leschetitzky in Vienna He was known throughout Europe as the prodigy *Max Hambourg* and at the age of 16 toured Australia He has since become one of the world's most popular artists having made many tours of America Australia and S Africa He is now a British subject and lives in London when not on tour



Harbour and Docks Hamburg

Hamburg, republic (free state) and free city of Germany, on the river Elbe. It is the largest port on the Continent. There are large shipbuilding yards, iron and steel founding, motor-car works, and chemical factories. Other manufactures are foodstuffs, beer, cabinet making, musical and scientific instruments. Commercial education is stressed, and well equipped commercial schools of navigation are State aided. Outside the town large areas are devoted to the cultivation of cereals, fruit, and potatoes. The harbours and docks, mostly constructed since 1888, cover an enormous area, and control a vast amount of shipping, a large volume of trade being with England and America. There are a new and an old town, connected by the Lombards Bridge. Modern Hamburg has broad streets and contains the Rathaus, the Johanneum, with its library and collection of Teutonic antiquities, the Art Gallery, and the Law Courts. The administration of the State of Hamburg is by a House of Burgesses elected since 1920 on the basis of proportional representation. Hamburg is the headquarters of the Hamburg-America Line.

The Peace Treaty vested Czechoslovakia with rights to use certain wharves at Hamburg, and a strip of land on the Elbe was in 1929 leased to the Czechoslovakian Government for 99 years.

Pop., Statc (1933) 1,181,550, City (1933) 1,092,425

Hameln, town in Hanover, Prussia, on the Weser. Its three main industries are distilling, sugar, and paper manufacture. At one time there was a flourishing salmon-fishing industry. Among the fine old buildings are the Minster and the Rattenfängerhaus, on which is inscribed the legend of the Pied Piper, with which the name of the town is associated. Pop (1933) 28,550

Hamilear Barca (d 229 B.C.), Carthaginian general and the father of Hannibal. Commanded the Carthaginian troops in Sicily during the first Punic

War, where he held his own against the Romans. In 236 B.C. he began a long and successful campaign in Spain during which he was killed.

Hamilton, name of an old and noble Scottish family descended from Walter Fitz Gilbert, on whom the barony of Cadzow, Lanarkshire, was conferred by Robert Bruce. His son DAVID assumed the name of Hamilton. Sir JAMES HAMILTON OF CADZOW was created Lord Hamilton (1445). After the death of his first wife, the widow of the Earl of Douglas, he married Mary, the daughter of James II. His son JAMES became 1st Earl of Arran (1503) and JOHN, a son of the 2nd Earl, was created Marquess of Hamilton (1699). The latter's grandson, JAMES, the 3rd Marquess and the 1st Duke of Hamilton, unsuccessfully fought Cromwell's troops at Preston, and was executed (1649). His brother WILLIAM, the 2nd Duke, royalist, died of wounds after the battle of Worcester. The 4th Duke, JAMES DOUGLAS (1658-1712) was killed together with his opponent Lord Mohun, in the duel described in Thackeray's *Esmond*. The heir of the present 15th Duke (b 1862), the Marquess of Douglas and Clydesdale, is well known as a sportsman and airman and in 1933 flew over Everest.

Hamilton, Alexander (1757-1804), famous American statesman. He fought with the revolutionists, and in 1777 was chosen as Washington's aide-de-camp. He became Secretary of the Treasury (1789) at the beginning of Washington's administration. He resigned (1795) to practise law, but 3 years later he took command of the Army raised to repel the feared French invasion. After Washington's death he tried to bring about the downfall of John Adams, the new President. In 1804 he died from wounds received in a duel with a political opponent, Aaron Burr. He is mainly famous as the apostle of American federation, and of the encouragement of home industries, being in a sense, the father of the Republican Party and of the American tariff.

Hamilton, Lady (Emma) (c. 161-1915) famous beauty was born in Cheshire in humble circumstances and brought up by her grandmother. She came to London as a nursemaid in 1781 and in 1789 became mistress of the Hon. Charles Greville and in 1786 of his uncle Sir William Hamilton who was British Ambassador at Naples. In 1791 he married her and as his wife she became the confidante of the Queen of Naples. She and Nelson met in 1793 and became intimate 5 years later their child being born in 1801 in England. After the deaths of Hamilton and Nelson in 1803 and 1805, respectively, she was left comfortably off but spent extravagantly and was imprisoned for debt. She died at Calais.

Hamilton Sir William (1788-1856) Scottish metaphysician and logician. In 1836 he was appointed Professor of Logic and Metaphysics at Edinburgh. In 1846 he produced his edition of the works of Thomas Reid and later developed his scheme of logic. He is especially remembered for his doctrine of the quantification of the predicate.

Hamilton, Sir Wm. Rowan (1803-1866) Scottish astronomer. In 1847 he became Andrews Professor of Astronomy and Astronomer Royal for Ireland and in 1835 he was knighted. His literary style was obscure and his written works difficult to understand but his extension of the meanings of mathematical symbols freed the science from the limitations that had cramped it for long ages.

Hamilton, city and port in Ontario Canada at the W. end of Lake Ontario. It is a busy manufacturing and rail centre, the important industries being railway rolling stock, agricultural machinery and textiles. The city was founded about 1785, it is said by Loyalist immigrants from the U.S.A. A considerable amount of fruit is cultivated in the district. Pop. (1931) 153,347.

Hamitic Languages, a group of African languages now considered to be

a collateral branch of the Semitic family of languages (qv). Its most important members are Berber and ancient Egyptian from the latter of which Coptic was descended.

Hamitic Races see AFRICA PEOPLE OF

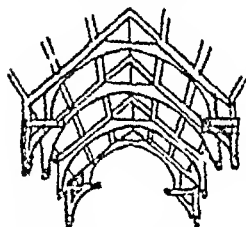
Hammer a tool employed to deliver a blow the force of which is augmented by the weight of the hammer head. In every handicraft in which hammers are employed a number of special forms are employed: the carpenter the mechanic the mason the copper-smith the jeweller the blacksmith and numerous other craftsmen each employ several and sometimes numerous different types of hammer.

The application of power to the hammer was a most important advance. It was preceded by the use of hand-operated trip-hammers—hammers too heavy to be handled in the ordinary way but pivoted about a point on the handle distant from the head and worked by lifting the head and allowing it to drop. The steam engine soon after its invention was employed to operate these by means of cams and other devices but the invention by Nasmyth in 1839 of the steam hammer was the beginning of a new epoch, for it could be made to develop any required power while at the same time the blow delivered could be regulated to a nicety. The steam hammer consists of nothing more than a vertical cylinder in which a piston travels; the hammer head is attached to the end of the piston rod. The steam is admitted below the piston and raises the hammer to any desired height. It is then allowed to fall the force of the blow being greatest when its fall is hastened by steam admitted above the piston.

A very important modern tool is the pneumatic hammer made in a large number of forms and weights for use in the hand. They are used for chipping work such as castings corroded surfaces and stone-work, for nailing and caulking. In many operations work can be done a three-

times the rate, and with less fatigue, than by the use of the hand hammer.

Hammerbeam Roof (architecture), type of roof common in Perpendicular and Tudor periods, having a series of hammerbeams. The tie-beam of an ordinary queen-post truss is cut away



Hammerbeam Roof, with collar braced truss

in the centre, the remaining portions forming hammerbeams. Each hammerbeam is supported by a hammerbrace (see illustration). Examples

Westminster Hall, London, Cawston Church, Norfolk

Hammerfest, a port on island of Kvalø, W Norway. It is the most N town in Europe, and exports fish, fish oil, and hides. Its harbour is used as a base by the Spitsbergen whale fishers. Pop c 3050.

Hammerhead Shark, a large tropical shark, which derives its name from the shape of the head, which has the ocular region prolonged sideways into thick processes with an eye at each end.

Hammer Mills, see CRUSHING AND GRINDING

Hammer Throwing, see ATHLETIC SPORTS

Hammer-top, a small, dark-brown African stork with a longish thick bill and a great tuft of feathers at the back of the head, the two combining with the slender neck to give the head a hammer-like appearance.

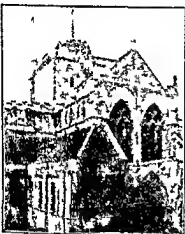
Hammond, Walter (b 1903), Gloucestershire and England cricketer. Played in his first test series 1928, when he was the star batsman of the side, and scored more than 900 runs in test matches. Was less successful in the 1933 series, but still ranks as one of the most effective players in the world, his test innings of 336 not out against New Zealand is a record.

Hammurabi, King of Babylon from c 2070 to 2020 B.C., celebrated as the formulator of the Hammurabi Code. By some he is identified as the Anuraphel of Gen. xiv. 1.

Hampden, John (1594-1619), English statesman. He entered Parliament in 1621, and 6 years later was imprisoned for his refusal to pay the forced loan. His vigorous opposition to Ship Money payments made him famous. He became a powerful member of the Short and Long Parliaments. He was one of the members whom Charles I vainly tried to arrest. He raised a regiment of troops for the Parliamentary army, but he was mortally wounded while fighting Prince Rupert at Chalgrove Field.

Hampshire (*Hants*, or *County of Southampton*), in S England, bounded N by Berkshire, E by Surrey and Sussex, W. by Wiltshire and Dorset and S by the English Channel. Its general physical features are a combination of hills, fertile valleys, chalk downs, rising to a height of 900 ft, and forest. The rivers are commercially unimportant and include the Test and Itchen, which runs into Southampton Water. The flora of Hampshire is varied and numerous. A peculiarity of the county is the profusion of the yew, sometimes called "the Hampshire weed," many of which have a girth of 25 ft. There are still a few red and roe deer in the New Forest. A considerable amount of the area is devoted to agriculture, oats, wheat, barley, and roots being the principal crops. Near the Surrey border hops are grown. Sheep, Southdown breed, or "short wools," are reared. A developing industry is brewing, shipbuilding is important. The lines of communication throughout the county are good, particularly the old coaching and turnpike roads. The three main towns are Portsmouth (pop 249,288), Southampton, the county town (170,025), and Bournemouth (116,780); area (excluding Isl of Wight), 1500 sq m.

Apparently the earliest settlers were Jutes followed by a Saxon tribe who penetrated as far as Winchester making that city the centre of their rule. Then came the Danes and a period of peace leading up to the crowning of Edward the Confessor. The death of William Rufus in the New Forest, the Winchester Parliament, the heroic defence of Basing House during the Civil War and the bloody assize presided over by Jeffreys after Sedgemoor are other historical events connected with the county. There are good



Romsey Abbey House.

examples of Norman architecture at Romsey Abbey, Christchurch Priory and Winchester, and the names of Wykeham, Wilberforce, Jane Austen and Gilbert White are linked with the county. Pop. (1931) 1014115.

Hampton Court, palace on the R. Thames 1 m. below Hampton and S. of Bushey Park, a magnificent example of Tudor architecture. Built by Cardinal Wolsey in 1515, it was given by him in 1526 to Henry VIII, who added a great hall and Gothic chapel. In 1604 it was the scene of the Hampton Court Conference between the Puritans and the Bishops, and after its

repurchase by Cromwell from a private owner in 1649 it continued as a royal residence until the reign of George II. William III had the Dutch garden laid



Plan of the Hampton Court Maze.

out and added a quadrangle from designs by Sir Christopher Wren. The gardens, State apartments and picture gallery are open to the public, the remaining suites being mostly occupied by crown pensioners. In the Wilderness (N. of the Palace) the Maze is situated.

Hamster, a rodent resembling a guinea pig but belonging to the mouse family. The typical and best known species is generally tortoiseshell in colour and is found in Central Europe and Asia. It lives in burrows and is extraordinarily prolific, multiplying sometimes to such an extent as to be a serious menace to crops.

Hamper, a treasury, also an office attached to the old Court of Chancery, so-called because all writs were kept in a hamper (Latin *hamperium*).

Handel, George Frederick (1685-1759), one of the great figures of music, composer of many operas and oratorios, of which *The Messiah* has won great and lasting fame.

Handel was born at Halle, the son of the surgeon to the Prince of Saxe-Magdeburg. In spite of parental discouragement he found an outlet for his passion for music in the clandestine study of the harpsichord, and when still a boy, through the intervention of the Duke



Handel.

of Saxe-Weissenfels, he was allowed to study with the organist of Halle Cathedral, and began composing church music.

After 3 years' study he went to Berlin, where he aroused the interest of the Elector Frederick. On the death of his father a year later, he went to the Hamburg opera as violinist, and there produced his first two operas in 1704 and 1705 respectively. A year later he visited Italy and stayed there until 1710, producing several Italian operas. The same year he visited England for the first time and produced *Rinaldo* (the tenor aria, "Ombra mai fu," from this opera has become famous as Handel's *Largo*) at the Haymarket Theatre. This opera had such a success that, though he had to return to Germany after its production, he was soon back in England again, and in 1712 was given an annuity after the composition of the "Utrecht" *Te Deum*. His first English oratorio was *Esther* composed in 1720, while he was chapel master to the Duke of Chandos. About this time also he began writing operas for the Royal Academy of Music, and commenced his famous rivalry with the Italian composer Bononcini, who was then in London. His most notable operas of this period are *Radamisto* (1720) and *Scipione* (1726). In 1733 Handel began his policy of acting as sole producer of his own operas, and rented theatres for his seasons. They were not a financial success and after a visit abroad to restore the health which his worries had undermined, he discontinued writing operas and turned his exclusive attention to oratorio. In 1738 he wrote *Saul* and *Israel in Egypt*, and in 1741 at a concert in Dublin the *Messiah* was performed for the first time. Its success was immediate and profound. In the same year *Samson* was performed, being followed by *Joseph* (1743), *Belshazzar* (1744), *Judas Maccabeus* (1746), *Joshua* (1747), *Solomon* (1748), and *Jephtha*, his last oratorio, in 1752. By this time Han-

del's eyesight was failing badly, and three operations failed to prevent the total blindness which overtook him before his death. From royalty downwards Handel was held in the highest esteem throughout the length and breadth of the land of his adoption, and he was buried in Westminster Abbey.

The complete edition of Handel's works runs to 100 volumes. These include some 40 operas, between 20 and 30 oratorios, many other choral works including the various *Te Deums*, *Odes*, and *Anthems*, and an immense amount of vocal and instrumental works of many kinds.

Handicrafts, term used to describe manual work, usually done at home either for home consumption or as a light industry. Before the Industrial Revolution all skilled workers in light industry were engaged in handicrafts, e.g. lace-making (Honiton), silk-weaving (Macclesfield and Spitalfields), decorative ironwork (Sussex), cloth-weaving (W. of England). Of recent years there has been a great revival of handicrafts, both as a means of assisting the rural population of the British Isles and as a hobby among the artistic section of the middle classes. Several centres have been established in the English countryside, and the National Federation of Women's Institutes has done much work in this direction, giving especial attention to the derelict mining areas of S. Wales. Similarly in Scotland and Ireland the making of hand-woven cloths and garments from native-dyed and spun wool, is being fostered and there is an increasing market for these products. For leatherwork, pen painting, poker work, weaving, etc., see under separate headings.

Hand Tree, a large tree (*Chirantho dendron platanoides*) related to the mallows, found in Mexico and Central America, with showy flowers whose spreading stamens suggest an open hand.

Handwriting, manner or style of writing script, characteristic of an individual. The chances against any

two persons handwriting being identical are so infinitesimal that any particular script may be said to be an expression of the individuality of the writer or in other words his exclusive property. This fact has become the basis of two entirely different types of investigation. On the one hand we have the handwriting expert whose evidence may be of importance in a court of law particularly in cases of forgery (qv). On the other we have the graphologist who attempts to tell character from handwriting.

In a court of law the methods applicable vary according to the question to be resolved. There is little difficulty in establishing the author of a writing when persons can be found who are acquainted with the supposed author's writing and no question of forgery has arisen. Where however no such person exists or where the genuineness of the writing is suspect the handwriting expert must be called in. His opinion may be based on a comparison of the characteristics of two writings. In the case of a single document he may be able to establish by exact scientific methods differences in ink alterations that may have been made chemically or supposing one word to have been written over another which of the two words was written first. There is nevertheless great danger in accepting expert evidence in such matters unless the proof is overwhelming and there are several cases on record where a miscarriage of justice has occurred. While English courts accept though with great caution the evidence of handwriting expert, continental and American courts have in several instances gone much farther and have received the evidence of graphologists. The dangers of this are patent.

The graphologist in addition to divining the character of his subject claims also to make precise deductions as to sex age profession nationality state of health and nature of any physical or mental disability or disease. It is true that certain coun-

tries and professions appear to have common characteristics thus we speak of an Italian or a commercial hand. The crude lettering of a child is obviously very different from the free flowing script of an educated adult and clerical people are sometimes supposed to write illegibly. Further if an individual writes under stress of emotion haste or drink he leaves ample evidence of his state of mind.

But generalisations from details are hazardous. It does not necessarily follow that large handwriting is the sign of ambition and small of pedantry that wide spaces between words betoken nobility of mind and crowded words meanness and that a careful man joins all the letters of a word while a careless man does not. A certain amount of guesswork is inevitable.

But it is not correct to say that all graphologists are quacks. A certain amount of judicious character reading ought to be possible from the examination of writing. The changing style of handwriting as between one generation and another belongs to the sphere of palæography (qv). See also CALLIGRAPHY, CRIME DETECTION.

Haugar see AERODROME.

Hank, a bundle of reeled yarn 1000 yds per turn in worsted trade and 1½ yds in cotton. A worsted hank is 560 yds and a cotton hank 840 yds.

Hankow a treaty port of Hupch China. Its position at the confluence of the Han and the Yangtze River renders it of great importance for transit trade for the port is of sufficient depth to receive ocean steamers. There are iron and steel works textile factories and rice oil and flour mills. It is also a great financial centre. Pop (1931) 779,313.

Hannay James Owen (b 1865) Canon of St Patrick's Cathedral Dublin and Rector of Melis Somerset. He is best known as the author of many novels written under the name of George A. Birmingham. These

include *Spanish Gold* and *The Seething Pot* (1913), *Lady Bountiful* (1921), *The Grand Duchess* (1924), *Wild Justice* (1930), and *The Silver-Gilt Standard* (1932). He has also written plays, *Eleanor's Enterprise* (1911), and *General John Regan* (1913) had great success. He wrote a light opera, *The Mermaid* (1927). Under his own name he has written *The Spirit and Origin of Christian Monasticism*, *Murder Most Foul*, and other works.

Hannibal (247-183 B.C.), great Carthaginian general, who from his earliest youth dedicated his life to vengeance against the Romans. In the year 221 he became ruler of the Spanish province, and began his first campaign. His successful 8 months' siege of Saguntum (219) precipitated the second Punic War against the Romans. The following year his army crossed the Pyrenees, marched through Gaul, and made its celebrated crossing of the Alps into Italy, one of its greatest early victories being that at Lake Trasimene (217). He utterly defeated the Romans at Cannae (216), and took Tarentum (212). He marched on Rome, but retired before superior forces, and in 203 Scipio's victories forced him to leave Italy to go to the help of Carthage. He failed to defeat Scipio at Zama (202) and made peace with Rome. In 195 the continued hostility of the Romans forced him to flee from Carthage and join Antiochus of Syria, after whose defeat at Thermopylae (191) and Magnesia (190) the surrender of Hannibal was demanded by the Romans. He took refuge with Prusias of Bithynia. In 183, however, through the treachery of Prusias, he was trapped by the Romans and poisoned himself to escape arrest. Hannibal was one of the few really great soldiers of history.

Hanno: (1) Carthaginian navigator whose most notable exploits were achieved c. 500 B.C. In his *Periplus*, which exists in a Greek translation, a voyage along the coast of W. Africa

is described. (2) Carthaginian general of the 3rd cent. B.C. who is said to have distinguished himself in Africa. He was the head of the aristocratic faction in Carthage and an enemy of Hannibal.

Hanoi, the capital of Tongking and French Indo-China, on the bank of the Song-koi, or Red R. There is an extensive trade in silks, cottons, pottery, tobacco, and matches. In 1917, the school of medicine for native and the European college were embodied in the University of Indo-China. Pop. (1930) c. 123,210.

Hanover: (1) Province of Prussia. The main part of the province lies between the Rs. Weser and Elbe. Rye, flax, sugar-beet, tobacco, and hops are grown. Minerals are plentiful in the hilly parts, coal, iron ore, silver, copper, and lead being mined. Apart from cattle, a speciality is made of poultry farming, particularly geese. In the S. are the Harz Mountains, and in the N. the famous Lüneburger Heide. The principal towns are Hanover, the capital, Hildesheim, Osnabrück, and Göttingen. From an electorate in 1692 it became a kingdom in 1814, between which period its elector, through his mother, became King of England (George I) in 1714. In 1837 it was separated from England. On Hanover deciding to side with Austria in 1866, it was invaded and annexed by Prussia. Area, 14,900 sq. m., pop. (1933) 3,365,600.

(2) Capital of above, is situated in a fertile plain on both banks of the Leine. It is an important railway junction. Among the manufactures are hardware, chemicals, pianos, tobacco, machinery, indiarubber, and furniture. A mediæval Rathaus, theatre, the Kreuzkirche, palace, House of the Provincial Estates, Kestner museum and the museum of Art and Science are among its prominent buildings. It was the birth-place of Herschel, the astronomer. Pop. (1933) 433,600.

Hanover, House of, the reigning family in Great Britain 1714-1901, lineal descendants of the Guelphs. By the Act of Settlement (1701) the

Electress Sophia of Hanover (grand daughter of James I) became heiress to the English throne and her son George Louis became George I in 1714. From then till 1837 Hanover and the English monarchy were united but on the accession of Queen Victoria as males only could occupy the Hanoverian throne the Duke of Cumberland her uncle became King of Hanover. Edward VII in 1901 initiated the house of Saxe-Coburg-Gotha.

Hanseatic League This dates back to the 13th cent. and survived into the 17th but precise dates cannot be given whilst even its exact membership is not known. At first it was an association of German merchants trading abroad but it soon developed into an association of the towns from which they came. An association of merchants trading in Scandinavia the Gothland Association was the forerunner of the Hanse League proper. The important trading centres of German merchants in N. and W. Europe took the lead in the early period of the League and the important centres were London, Bruges and Bergen. In London the merchants of Cologne obtained the right to form a guild to which they might admit other German merchants on the payment of a fee. The growing ascendancy of Lübeck is seen in that city obtaining remission of this fee through Imperial grant and the right to establish its own guild from Henry III in 1167. The rival German associations amalgamated and their headquarters in London were known as the Steelyard.

The Hanseatic League was a very loose federation under the accepted leadership of Lübeck. The rise of new trading nations and alterations in the main trade routes led to the decline of the League. In England the Hanse merchants met with growing opposition on the part of native interests. Although the League was able to renew its privileges in 1474 the rise to power of the Merchant Adventurers Company especially as

financiers of the impecunious Queen Elizabeth led to the withdrawal of the most of Hanse privileges. In the Baltic the monopoly of the League was broken by a war with Holland in 1441. The position of the League at Bruges while still maintained became less and less important as Bruges itself declined and Antwerp and later Amsterdam succeeded it as the commercial centres of the Netherlands. The great fairs of Leipzig and Frankfurt on Main were at the same time developing at the expense of Hanse trade with Russia and the League with its preservation of old privileges and its system of monopolies was being superseded as a commercial power by economic changes over which it had no control. Finally the 16th cent. saw wars with Scandinavian Powers which completed the decline begun by changed conditions and internal dissensions.

Hansom, Joseph Aloynus (1803-1887) English inventor and architect known to posterity through the hansom cab which he designed originally without the later outside seat. He also built numerous churches and schools and was the architect of Birmingham Town Hall.

Hanukah or Chanukah (Heb. dedication) the festival of the Maccabees celebrated by Jews by the lighting of candles on 8 successive nights commencing with Kislev 25 (Dec-Jan). One light is lit on the first night and an additional light is added every night until the 8th. Hebrew tradition relates that on this day Judas Maccabeus finally cleared the Temple in Jerusalem of the pagan abominations introduced by Antiochus Epiphanes (c. 170 B.C.) and rededicated it.

Hanway Jonas (1712-1786) English philanthropist. He first entered business at Lisbon later moving to St. Petersburg. From 1743 to 1745 he sold woollen articles in Persia. In 1750 he returned to England published in 1753 an account of his travels. He was a Commissioner of

the Victualling Office from 1762 to 1783, and was the first man in London to use an umbrella. He founded the Magdalen Hospital for Women, and Hanway Street is named after him.

Hapsburgs, *see* HABSBURG

Hara-kiri, the Japanese custom of self-disembowelling originated as an act of grace on the part of the Emperor, who allowed nobles to execute themselves in this manner instead of being brought to trial. It is also an honourable exit for those who, through poverty or other troubles, are tired of life. At times it has been committed by ardent patriots wishing to show their disapprobation of any action on the part of the Government. The rite is carried out according to detailed rules, and wipes out any crime or misdemeanour, so that no stain remains on the family honour. Women commit hara-kiri by cutting the throat, as did Madame Butterfly in Puccini's opera. Hara-kiri as a method of execution was not abolished until 1868, shortly after Japan had been opened to foreign trade and influence.

Harald III (1015-1066), King of Norway, the son of King Sigurd and half-brother of King Olaf, after whose death in battle he fled first to Novgorod and then to Constantinople. In 1042 he went to Sweden, and fought with Sweyn of Denmark against his nephew Magnus, who occupied the Norwegian throne. He later came to terms with Magnus and accepted half the Kingdom, and on the latter's death made attempts to conquer Denmark. He invaded England in 1066, and was killed at Stamford Bridge in battle with Harold of England.

Harbin, Manchurian town and port on the Sungari R. It is an important industrial and railway centre with distilleries, flour-mills, and soy-bean works. The Chinese Eastern Ry connects it with Vladivostok, and the S Manchurian Ry with Mukden, Lientsun and Port Arthur. Pop (1931) 330,400.

Harbour, a sheltered stretch of water used by ships either for the purpose of loading or unloading goods or for taking protection from storms. Harbours may be either natural or artificial, though unaltered natural harbours are rare. Practically, all harbours have come into existence on account of some slight natural advantage of one site over the adjacent coast. Natural harbours may be formed by a partially enclosed bay (e.g. Rio de Janeiro), an island-protected roadstead (e.g. Portsmouth, New York) or a twisted estuary (e.g. the Thames, the Mersey). Artificial harbours are usually formed by means of converging breakwaters projected from the shore (e.g. Tynemouth, Dover), by protective breakwaters parallel to the shore (e.g. Marseilles, Genoa), or by breakwaters built out from the headlands of a bay (e.g. Valetta). Artificial harbour-works date probably from Cretan times (2000 B.C.) and were frequently constructed by the Phoenicians. The famous harbour of Alexandria was built in the 4th cent. B.C. and its famous Pharos was added in 283-247 B.C. Modern harbour-building in England began in the 18th cent. with the work of Smeaton, Telford, and Rennie. The essential qualities of commercial harbours are: (1) sufficient depth to take, at all states of the tide, the largest vessels which will have necessity to use the harbour; (2) shelter of such a nature as to allow of a calm stretch of water and good anchorage even during severe storms; (3) an entrance not wide enough to diminish the tranquillity of the inner basin, but at the same time broad enough to permit of easy navigation during bad weather; (4) suitable protection, in the form of groins or breakwaters, to ensure that the entrance to the harbour shall not be silted up.

Many harbours, especially those constructed before the advent of large steamships, were built to take advantage of natural conditions with no particular reference to the depth

of water at all states of the tide. So it is now a common sight round the coasts of England to see harbours which will accommodate small vessels only and even these at low tide are left high and dry inside the harbour. If it is essential to construct a harbour at a point where there is a high tidal range and it is also necessary to keep vessels afloat at low tide then a deep-water basin must be constructed. This is a basin surrounded by quay walls which is flooded at high tide and in which the water is retained at low tide by inward opening dock gates.

Tranquillity inside the harbour may be preserved by natural surroundings such as hills which give shelter from the wind but it is also necessary to give attention to wave action. Waves passing through the entrance must have room to expand; the width of the opening must therefore be considered in relation to the area of the harbour. In some cases a single basin with an opening direct to the sea is not sufficiently sheltered and it may be necessary to construct an outer breakwater to break the main force of the waves. The harbour will then consist of an inner and an outer basin; the latter serving as a refuge whilst the former will be equipped for commercial uses. The position of the entrance to the harbour will depend upon local conditions and will be largely determined by the direction of the prevailing wind. Harbours may often be provided with more than one entrance. Two entrances however whilst providing vessels with an alternative entrance according to the state of the wind do not tend to increase tranquillity. A double entrance is not therefore adopted unless there is an outer stilling basin.

It is most important that the harbour should not become silted up. The entrance to a harbour is generally kept clear of silt by the principle of strengthening the ebbing current. This may be done by constructing training dykes on either side of the

entrance so that the outward tidal flow is concentrated and gives rise to a scouring action which washes away the bar. Another method of clearing the harbour entrance is by the use of a scouring basin. This consists of a dock or basin in which the water is retained at high tide by dock gates and is released at low tide to act as a scour. The outlets of the basin should be in the same line as the channel to be scoured and they should be arranged to cover the whole of the channel and not to concentrate in one narrow line. Where a river or stream flows out through the harbour it is usual to direct its course so that it shall help to scour the channel. Thus it may be taken along the side of a quay to preserve a channel there even though the rest of the harbour may be dry or nearly so at low tide. Training-dykes should always be made to converge towards the outlet. This has the effect of concentrating the scour at the bar and at the same time providing a funnel shaped space into which waves from the open sea may expand.

In harbour work breakwaters and quay walls must be carefully designed to resist wave action. Breakwaters may be long sloping or steep-sloping. The former have sides sloping at a gradient varying from 1 in 3 to 1 in 7. The waves expend their force by breaking on the slope. To prevent waves passing over the top of the wall a berm is usually provided. This consists of a horizontal set back at the top of the wall with a heavily built parapet wall rising from it. The top of the parapet wall should be below the plane of the slope. The heaviest docks in the wall construction should be placed at about the level of half tide at which period the waves are largest. Steep-faced walls are essential where they are to be used as loading quays. They are usually designed so that the waves shall be reflected off the surface and break back on themselves. No projecting lopes or courses should be introduced, as the wave

pressure may overturn the stones by striking on the projecting surface

A dock differs from a basin in being fitted with a lock at its entrance, permitting entry of vessels into the dock at all states of the tide. A *dry* dock is an ordinary dock, which can be emptied of water, enabling the hulls of vessels to be examined with ease. *Floating* docks take the form of a rectangular box, without ends or top, the bottom and sides being constructed of the skins with a space in between. When it is desired to examine a vessel and no permanent dry dock is at hand, the floating dock is sunk to a sufficient depth and is towed underneath the vessel. The wall spaces are then emptied of water and the whole dock rises till the vessel is lifted dry out of the water. The reverse process is adopted to launch the ship.

Harden, Maximilian (1861-1927), German journalist, a bitter critic of the Imperial and Revolutionary Governments, founded *Die Zukunft* in 1892. Collected essays and articles appeared, as *Köpfe*, in 1910-24.

Hardicanute (c. 1020-1042), son of Canute of England, on whose death Hardicanute unsuccessfully contested the throne with his half-brother Harold (*qv*), who became King in 1037, but died 3 years later. Hardicanute then ascended the throne, and after a brief but tyrannical reign, died suddenly while participating in a feast.

Hardie, James Keir (1850-1915), British Socialist politician, who virtually founded the I.L.P. in 1893. Of Scottish birth and poor parentage, he worked in the mines as a boy, later becoming Secretary of the Ayrshire Miners' Union. He was the first independent Labour M.P., being elected for West Ham in 1892, and afterwards represented Merthyr Tydvil. In 1906 he became leader of the Labour Party in the House of Commons. To his life work the development of the Labour movement is largely due.

Harding, Warren Gamaliel (1865-

1923), 29th President of the United States. Born in Ohio, he began in 1884 to attract notice by his editorship of the *Marion Star*. In 1904 he became Lieutenant-Governor of Ohio and was an unsuccessful candidate for the Governorship in 1910. In 1919 he was elected to the Senate. He was chosen by the Republicans as candidate for the presidency in 1920, and was elected by a very large majority. His administration was notable for the calling of the Washington Conference on the limitation of armaments and for his opposition to American participation in the League of Nations.

Hardness, the resistance which a body opposes to penetration. It is a property of the surface of bodies difficult to correlate with fundamental constants expressing the mechanical qualities of the substance, but of considerable practical importance. The first attempt to standardise the measurement was made by Mohs, who set the following minerals in increasing degrees of hardness, as 1, Talc, 2, Gypsum, 3, Calcite, 4, Fluorite, 5, Apatite; 6, Felspar, 7, Quartz, 8, Topaz, 9, Corundum, 10, Diamond. Any mineral in the list will scratch the surface of any other having a lower number.

The method almost exclusively used to-day was devised by Brinnell, but suits only plastic substances. It consists in forcing a steel ball of a certain size on to the surface to be tested, producing an indentation whose size is measured. In brittle material a circular crack is produced and the pressure required measured. A much more important case is that of a material which yields, the degree of yield being measured by the area of the indentation made by the ball. Much has been written concerning the theory of the Brinnell and similar methods of testing, and attempts have been made to correlate the results to allow of a certain amount of comparison between widely different substances. One of the chief investigators (Auerbach) gives the following

gures for the hardness of various substances Wax 1 tin 11 lead 1 common salt 20 silver 91 brass 170-318 steel 280-900 diamond 2500 While these figures are of course only roughly comparative the regular application of the Brinnell test to metal employed in manufacture is of great importance since it can usually be applied without damage to a finished part and serve as an excellent indication whether the metal is normal in its properties An interesting instrument is the Shore scleroscope which allows a light weight (cent) armed with a diamond point to fall on the surface of the substance to be tested and measures the height of the rebound This test can be brought into good correlation with the Brinnell test The instrument itself can be carried in the pocket and applied to metal parts actually in position

Hardwicke Cedric (b 1893) actor He studied at the Academy of Dramatic Art and made his debut in *The Woman and the Woman* (1912) Joined the Benson Company in 1913 and the Birmingham Repertory Theatre in 1922 He has acted in many Shaw and Shakespearean plays and also scored notable successes in *The Barretts of Wimpole Street* *The Farmer's Wife* and *The Late Christopher Bean* Is well known for his appearances at the Malvern festivals and has acted in several films including *Rome Express*

Hardwood heavy close grained wood specifically that of any deciduous timber tree contrasted with that of pines Examples oak mahogany teak rosewood walnut lignum vitae

Hardy Thomas (1840-1928) English poet and novelist was apprenticed to an architect His early poems and short stories were followed in 1871 by a novel *Desperate Remedies* and by his first success *Under the Greenwood Tree* (1872) *A Pair of Blue Eyes* (1873) and his first major work *Far from the Madding Crowd* (1874) a Wessex story appeared in *Tinsley's*

Magazine and the *Cornhill* respectively *The Return of the Native* (1878) *The Trumpet Major* (1880) *The Mayor of Casterbridge* (1886) *The Woodlanders* (1887) *Tess of the D'Urbervilles* (1901) his masterpiece and *Jude the Obscure* (1896) followed In these and in *Wessex Tales* (1888) and *Life's Little Ironies* (1894) Hardy's strong descriptive and dramatic power and his linking of scene and event into one ironic whole are masterly His stories are tragedies wherein man is seen as the plaything of the gods a futile victim of the blind cruelty of circumstances

The Dynasts (1904-8) a dramatic epic of the period of the Napoleonic Wars

Wessex Poems (1898)

Thomas Laughing

Sixties (1909)

Satires of Circumstance

(1914) and

Winter Words

(1928) are his best known poetical works They express in somber tones his love of nature and his ironic conception of man's place in it

Hardy Sir Thomas Masterman (1769-1839) English sailor flag-captain on the Victory under Nelson at Trafalgar and with him at his death He was made rear admiral in 1800 and was First Sea Lord from 1830 to 1834

Hare the name of a large number of species of rodents (q.v.) distinguished from rabbits by their longer ears and legs and by their habits They do not burrow but lie up in a clearing in the grass called the *form* in which the young are born covered with hair and with the eyes open Hares are nearly universal in distribution occurring even in the far north where



Thomas Hardy

they turn white in winter, but not in Australia or in Madagascar. The N European species, known as the blue or variable hare, is represented by local races in Scotland and Ireland, but in Ireland it does not always turn white in winter. These races are more rabbit-like in colour and proportions than the common English hare, which in the Lowlands sometimes hybridises with the typical Scotch hare. One of



Hare

the best-known species in the United States is called the jack rabbit.

Hare, Sir John (1844-1921), English actor-manager, first London appearance, 1865, manager of the Court Theatre 1875-9, and of the St James's, with Mr and Mrs Kendal, 1879-88, lessee and manager of the Globe, 1889, and of the Garrick, 1897. Last appearance, 1917, knighted, 1907. One of the most perfect comedy "character" actors of the 19th cent. One of his famous parts was that of Benjamin Goldfinch in *A Pair of Spectacles*. Another was in *The Gay Lord Quex*, and a perennial favourite was his production of *A Quiet Rubber*.

Hare, William, see BURKE, WILLIAM.
Harebell, *Campanula rotundifolia*, blue, bell-shaped flower (family Campanulaceae), abundant on heather and dry meadows. The stem is wiry, the leaves narrow and tapering.

Hare-lip, a deformity of ante-natal origin, in which palate and upper lip are cleft.

Harem, name given in Mohammedan countries to the part of the house in which the women are shut

off, but often extended to include the women themselves. The custom of secluding the women is a very ancient one in the East; only the husband or close blood relations are permitted to see their faces. The conditions under which the harem is conducted vary widely. By Islamic law, a man may have 4 wives—the sultan up to 7—and each wife is entitled to a separate apartment. Harems are often in the charge of eunuchs. In Turkey and India, where Western civilisation is increasing in influence, the inmates have a certain amount of liberty.

Harewood, Henry George Charles Lascelles, 6th Earl of (b 1882), served in the Grenadier Guards and Yorkshire Hussars. He was A.D.C. to the Governor-General of Canada 1907-11. During the World War he served with distinction, winning the DSO and bar. In 1922, as Viscount Lascelles, he married H.R.H. Princess Mary, now the Princess Royal. He succeeded his father in 1929. He was appointed Lord-Lieutenant of the W. Riding of Yorkshire in 1927 and Royal Trustee of the British Museum in 1930.

Harfleur [AHRETLER], French seaport near Havre, Seine-Inférieure. The industries of importance are pottery, chemicals, and distilling. In 1415 the town was taken by Henry V, and the foundation of the Gothic church is attributed to him. Pop 5080.

Harfleur, Sieges of (Hundred Years War). Henry V laid siege to the town in Aug 1415, and after a 3 weeks' siege and an obstinate defence, on Sept 22 Gaucourt opened the gates and the English took the town. Henry expelled all those inhabitants who would not swear allegiance to him as King of France, and re-populated Harfleur with English immigrants. In May 1416 the French besieged the town, but in July it was relieved, and the French fleet destroyed by an English fleet under the Duke of Bedford. In 1435 Harfleur was retaken by the French, but was recaptured by the English in July 1440, in Dec 1449.

finally fell into the hands of the French

Hargreaves James (d 1778) inventor. He is said to have invented the spinning jenny in 1764 and set about building such a machine with 8 vertical spindles. At first he used the machine himself but at last was driven by need of money to construct one for sale at which the spinners by the old fashioned wheel became alarmed and set fire to his house. Migrating to Nottingham he found a partner who supplied money to build a cotton mill in which the jenny was used and despite actions for infringement of

patent by rubbing their rims with a moistened finger. The glasses were popular in the 18th cent.

Harmonic Analyser and Integrator
Any alternating motion such as a sound wave alternating electric current tidal motion etc can be represented on a diagram in the form of a curve. If the motion is of the type known as simple harmonic e.g. the swing of a pendulum bob the curve is a sine wave but in other cases the curve is more complex. Whatever the nature of the curve however so long as it is periodic in character it is repeated over and over again it can be considered as the combination of a number of sine waves and the analysis of such a curve into its component parts is called harmonic analysis.

By the application of Fourier's series this analysis can be carried out by calculation but since the work is usually very laborious special machines known as harmonic analysers have been constructed to perform the analysis. These consist usually of one or more spheres which roll over a disc in contact with a cylinder. As the spheres move the disc and cylinder move in other directions and a special figure indicator gives the values of the component curves. The curve to be analysed is first drawn and the spheres are rolled through a distance depending on the ordinate of the curve at any point the instrument then giving automatically the required components.

If the components are known and it is required to find a curve which shall have these components this is the reverse process and is called integration. A harmonic integrator is an apparatus for performing this integration mechanically.

Tide Predictor A curve is first obtained which represents the motion of the tide over a period. This curve is then analysed by means of a harmonic analyser and by comparison with the positions of the sun and moon over the same period the characteristic components of the tidal motion at that place can be found. It then remains



Model of Hargreaves Spinning

patent and popular opposition the jenny soon came into general use.

Harlech, watering place in Merionethshire N Wales largely dependent upon tourists. There are ruins of a castle whose brave defence during the Wars of the Roses is said to have inspired the popular Welsh air 'The March of the Men of Harlech' Pop c 1100.

Harlequinade see PANTOMIME
Harmodius, young Athenian who with his friend Aristogiton plotted in 514 B.C. to assassinate the tyrant Hipparchus and his brother Hipparchus. They succeeded in killing the latter but were themselves subsequently slain, their memory being held in high honour by the Athenians.

Harmonica, an instrument in which the sound is produced by striking pieces of glass. Originated from the musical glasses which were glasses containing water arranged in a row from which musical sounds were pro-

to combine these components into one single curve in order to obtain the tidal curve which gives the state of the tide at any future time

Harmonium, a pneumatic keyboard instrument, in which a bellows operated by the feet acts upon the reeds. It was first patented in Paris, 1843. See also AMERICAN ORGAN

Harmony, the department of musical science concerned with the laws governing the chord-combinations of sounds at different pitch, and their relation or progression. Greek harmony was based on three tetrachords, from which the scales were derived: these were the diatonic, the chromatic, and the enharmonic. The old Greek scales, on which the mediæval church modes were based, are supposed to derive from the older Egyptian ones.

Semitones or chromatics were introduced with the development of a subtler tonal sense, and though these were at first forbidden by the ecclesiastical authorities, they soon came into general use. An advance towards the attainment of harmony was made in the 11th cent., when the *descant* was evolved which permitted of the singing of two separate parts at the same time to produce two-part harmony, but the evolution of counterpoint (*q.v.*), which followed from the descant, did little to further harmony in its modern sense: polyphonic music being conceived "horizontally," while modern harmony is essentially "vertical." In the 17th cent. however, Monteverdi, to whom we are largely indebted for the birth of opera, broke the laws of counterpoint by introducing combinations of sound which were then held to be new and startling discords. He scandalized musicians of his time by introducing the unprepared dominant 7th among other innovations, and his revolutionary work in this field is largely the basis upon which modern harmony was built up. The work of the great Neapolitan Alessandro Scarlatti did much to develop the growth of harmony, but it was the master Bach who

did most to reveal the great possibilities of modern harmony by his reconciliation of the old polyphonic and the new harmonic systems.

Modern harmony is based on the concord, *i.e.*, a chord which is complete in itself, and the discord, which must be resolved into a concord before it can be said to have finality, and satisfy the ear. What is called "triad" is the union of a "root" note with its 3rd and 5th. The addition of the 7th to a triad gives us the discord of the dominant 7th, which resolves to the triad of the tonic, and is the most frequently-heard discord in music. The discord has been very much exploited in recent times by modern composers, some of whose harmonic experiments have been, to say the least, surprising. Schönberg has been an ardent advocate of "atonality" (without definite key) and other new harmonic effects have been introduced by such composers as Bela Bartok. But it must be borne in mind that a composer who refuses to allow himself to be bound by tonality is no more iconoclastic than every other great figure in the history of music, all of whom have at some time or another decided that the rules of harmony were made to be broken and have thus made music infinitely the richer.

Harmonotome, see ZEOLITES

Harmsworth, Alfred Charles William see NORTHCLIFFE, VISCOUNT

Harold I (Harefoot) (d. 1040), King of England in succession to his father Canute. During the absence of his half-brother Hardicanute (*q.v.*) he claimed the crown and was elected Regent, and in 1037 was finally crowned his reign lasting 3 years.

Harold II (c. 1022-1066), English king. As the Earl of East Angles, he was banished in 1051 with his father Godwin. They returned a year later and on Godwin's death in 1065 Harold became Earl of Wessex and Godwin's successor, and was crowned King in 1066. He was defeated at Stamford Bridge Har-

Hadrada of Norway and his ally Tostig who had landed at the Humber and then returned south to meet William of Normandy near Hastings where he was killed in battle by a Norman arrow

Haroun-al Raschid, see HARUN AL RASHID

Harp see ORCHESTRA

Harper's Ferry small town W Virginia USA Notable only for the raid (18.9) by John Brown (qv) and a handful of men on the armoury which they held for twenty four hours until it was taken by General Lee Top 706

Harpies, monstrosities of classical origin described as winged creatures having the head and breast of a woman, and the body and limbs of a vulture They are best known from the story of the Argonauts and were the tormentors of blind king Phineus whose food they stole They were also considered impersonations of whirlwind and storm They are



to harpy shield of Nuremberg

sometimes used in heraldry the arms of Nuremberg being azure a harpy displayed armed and crowned

Harpignies Henri (1819-1916) French painter of the Barbizon school was 27 when he first began to study painting He was greatly influenced by Corot and produced many finely constructed landscapes in water colours and oils One of his best known works *Le Soir dans la Campagne de Rome* now hangs in the Luxembourg and he is well represented in the Tate Gallery

Harpsichord The forerunner of the pianoforte a keyed instrument which differs from the piano in that the strings are plucked instead of

being struck by hammers The resulting sound was much thinner than



Mid 18th C c 11 fms hard made by Jacobus Kirckmann

that of the pianoforte so that an arrangement whereby the octave below a note could be sounded at the same time as the note was invented

Harpy Eagle a handsome species of eagle with a crest of feathers on the head found in the forests of Brazil. It feeds mostly on monkeys sloths and smaller mammals

Harrier (1) A hound closely resembling a fox hound but smaller and used for hare hunting the pack being followed either on horseback or on foot (2) Name of three rare British species of the falcon family known as the Hen harrier Marsh harrier and Montagu's harrier distinguished by their long legs wings and tail by the presence of a small owl like crest round the cheek and by the difference in colour between the two sexes Harriers frequent open moorland or marshy country and feed largely on frogs snakes lizards and mice

Harris, Frank (1856-1931) author and critic a prominent figure in literary circles until the World War when he became violently anti-British He had an adventurous career in the USA before returning to England where he had edited the *Fortnightly Review* and other periodicals His published work

cludes *Elder Conklin*, *Montes the Matador*, *Contemporary Portraits*, a *Life of Bernard Shaw*, and short stories

Harris, George, 4th Baron Harris (1851-1932), English cricketer and administrator, educated at Eton and Oxford, played for Kent, 1870-89 and 1896-7, captain, 1875-89, took team to Australia, 1878, captained England against Australia at the Oval, 1880 (first Test Match played in England), and twice in 1884, President of M.C.C., 1895, Governor of Bombay, 1889-95

Harris, Joel Chandler (1848-1908), American journalist and creator of "Uncle Remus". His stories in the negro dialect appeared under the title *Uncle Remus his Songs and Sayings* in 1880. Other works are *On the Plantation* (1880), *Nights with Uncle Remus* (1883), *Uncle Remus and his Friends* (1892), and *Mr Rabbit at Home* (1895)

Harrisburg, capital of Pennsylvania, U.S.A., on the Susquehanna R. It has large iron and steel works, cotton and cigarette factories and flour-mills. Its surroundings are beautiful. Pop. (1930) 80,339

Harrison, Benjamin (1833-1901), 23rd President of the United States, was born in Ohio, and studied law, being called to the Bar in 1853. After serving with distinction in the Civil War he resumed his legal practice until 1881, when he was elected to the Senate. In 1888 he was chosen by the Republicans as presidential candidate, and was elected. The settlement with Great Britain of the Bering Sea question, and the meeting of the Pan-American Congress, were two of the notable events of his administration.

Harrison, Frederic (1871-1923), English author, philosopher, and writer on law, was called to the Bar in 1898. He was a Professor of Law under the Council of Legal Education and served on several Commissions on law and trade unions. He was a Positivist in philosophy. His works comprise historical and biographical studies, literary

essays including *The Choice of Books* (1886), and memoirs. He was a champion of liberty, reason, and individualism, and the last of the Victorian "giants of thought."

Harrison, John (1693-1776), inventor. Starting life as a carpenter, he constructed a clock entirely of wood which is now in the Science Museum at S. Kensington, the wooden wheels still in perfect condition. He invented a number of devices and improvements for clocks, and in 1713 a chronometer for measuring longitude at sea which was accepted by the British Government and for which he ultimately received £20,000.

Harrison, Thomas (1606-1600), supporter of Cromwell. Served with Ilectwood at Marston Moor (1644) and at Naseby, and signed Charles I's death-warrant. Harrison held chief command in England during Cromwell's absence, 1650-1, and aided him in expelling the Long Parliament, 1653. He was imprisoned in 1655 and 1658 and was executed at the Restoration as a regicide.

Harrison, William Henry (1773-1841), 9th President of the United States. Born at Berkeley, Va., he served in the army from 1791 until 1798, when he forsook soldiering for politics, becoming Governor of the N.W. territory, and in 1800 Governor of Indiana. From 1803 till 1811 he effected several boundary agreements with the Indians, but ultimately came into conflict with them at the Tippecanoe R., where he gained a notable victory (1811). In the fighting with Great Britain which followed, he took prominent part, attaining the rank of major-general. In 1816 he entered Congress, and 3 years later was elected to the Ohio Senate, becoming United States senator in 1825. A President his term of office lasted only from March to April, 1841, when he died of pneumonia.

Harrogate, a town and health resort in the W. Riding, Yorks, noted for its mineral springs, chiefly sulphur and

saline. A musical festival is held here annually. Pop (1931) 39 785

Harrow (or *Harrow-on-the-Hill*) a parish and urban district of Middlesex England situated c 10 m N W of London. Pop 26 370 Of recent years with the increase of railway facilities it has grown rapidly. It is on a hill which rises steeply 300 ft from the plain below. It is famous for its parish church (Early English) and its public school founded by John Lyon which



Harrow School

received a charter in 1571. It was opened in 1611 as a school for the children of Harrow. In 1800 the taking of pupils from other parishes was sanctioned by law although for some time previously this had been the custom and the school had by that time achieved an eminence which made it a rival of Eton. Administration of the school was reorganised under the Public Schools Act (1868). The original schoolroom is still in existence but the chapel library and speech room are modern. A good general education is provided. The annual cricket match with Eton played at Lords was instituted more than a century ago. Among the many famous men educated here were Byron Sheridan Galsworthy and Mr Stanley Baldwin.

Harrowing of Hell, title of a 13th cent E Midland English poem in dialogue form. It tells of the descent of Christ into Hell and the deliverance of the souls of the just.

Harry the Minstrel (or *Blind Harry*) A 1490) Scots poet author of *The*

Acts and Deeds of the Illustrious and Valiant Champion Sir William Wallace Knight of Ellerslie (1488?) one of the earliest Scots poems written in heroic couplets. Harry is mentioned by Dunbar in his *Lament for the Makaris* (1503).

Hart, Sir Robert (1835-1911) British customs official in China. born in Ireland entered the consular service in China in 1854 and in 1863 became Inspector-General of the Chinese maritime customs. In 1908 he resigned and left China where his work had greatly aided British and European interests. He received decorations from both the British and Chinese governments.

Harte Francis Bret (1839-190) American humorist was a printer and journalist until his *Condensed Novels* parodies (1864) made him famous. *The Heathen Chinee* (a poem) *The Luck of Poring Camp* *Isables* and *The Outcasts of Poker Flat* (stories) are best known of his works.

Hartebeest, a large ungainly antelope found in Africa and related to the Gaur but differing in having no mane on the throat or nape a long narrow face and



Hart beest

horns erect and curved or strongly hooked. Two of the S African species the Blessbok and Bontebok both now rare are remarkable for having a white blaze on the face when adult.

Hartford, capital and port of Connecticut USA situated on the

Connecticut R It is an industrial centre with extensive hardware and small-arms factories, typewriters, motor accessories, and aeroplanes are also manufactured. The State Capitol is the chief building of note. Hartford is an important educational centre. There is a municipal airport near by. Pop (1930) 164,100.

Hartlepool, seaport and parliamentary borough of Durham, on the North Sea, N of the Tees estuary. There are actually two towns divided by Hartlepool Bay, of which W Hartlepool (pop 68,134) is the larger and constitutes a county borough. E Hartlepool is a municipal borough. There is a good harbour and large shipbuilding, chemical and engineering works. Pop (1931) 20,545.

Hartmann, Karl Robert Eduard von (1842-1908), German philosopher, was born in Berlin and educated for the Army, but, attracted to philosophical studies, he produced his first work, *The Philosophy of the Unconscious*, in 1869, which was an immediate success.

Hart's-tongue, a common English fern, with long, undivided, dark-green leaves having brown ridges of spores set obliquely on their backs. The hart's-tongue is 1-2 ft high, and found wherever moisture and some shade are available, on rocks, in crannies of old walls, on hedgebanks, and by streams and waterfalls. A variety is sometimes found with the tip divided in two for a few inches, and each piece curled on itself, and this peculiarity has been induced in several cultivated varieties. Cultivation is easy, moist sandy rich soil and shade being the only necessities for healthy and luxuriant growth.

Harty, Sir Herbert Hamilton (b 1880), British conductor, born in Co Down, Ireland, first became known as a pianist, but since 1920 has been famous for his excellent work as conductor of the Hallé Orchestra of Manchester, particularly as an interpreter of Berlioz. He is also a composer, his works including the *Irish Symphony*, Violin concerto in D minor, Piano concerto in B minor, *The Mystic*

Trumpeter for chorus and orchestra, songs and instrumental pieces. He was knighted in 1925.

Harun al-Rashid (or *Haroun-al-Raschid*, 765-809), Caliph of Bagdad, immortalised in *The Arabian Nights*. The brilliance of his reign was mainly due to his capable grand vizier. Revolts took place among his subjects, and during one of his expeditions against the rebels he died. During Harun's reign Bagdad became the artistic and intellectual centre of the East.

Haruspices, Etruscan diviners who foretold events from the observation of the entrails of slain animals. They were abolished by Constantine in A.D. 337.

Harvard University, the oldest centre of higher learning in the U.S.A., founded in 1636 at Cambridge, Massachusetts, by the general court of Boston, and named after John Harvard, first donor and benefactor. It awarded art degrees alone until 1782, when a faculty of medicine was added. It continued to be the cultural centre of New England and America until the life throughout the 19th century. Longfellow, Oliver Wendell Holmes and James Russell Lowell, among others, lectured there. Besides the faculties of law (1817) and divinity (1819), there are special schools attached for the study of dentistry, agriculture, science, business administration, and engineering. The University includes a botanic garden, zoological, ethnological, archaeological, Semitic and Germanic museums, an astronomical observatory, the largest university library in the U.S.A., and an art gallery. The keen rivalry between Harvard and Yale (*q.v.*) Universities is comparable with that of Oxford and Cambridge.

Harvest-Bug, immature specimen of a small red mite which lives in the grass and burrows into the human skin, setting up severe irritation. The best treatment is sulphur ointment or tincture of iodine.

Harvest-man, a small spider-like

animal abundant in the country and about houses in summer and autumn in England distinguished from a true spider by its rounded undivided body and very long thread-like legs. It feeds upon mites and other tiny animals but does not spin webs (*see* ORIBATEI).

Harvesting Machinery *see* AGRICULTURAL MACHINERY

Harvey Gabriel (1848?-1893) English author was a friend of Spenser and a member of the Arcopagus Club which had as its object the introduction of classical metres into English. Harvey's English hexameters caused bitter controversies and he was satirised by Greene in *A Quip for an Upright Courtier* and by Nashe in *Have With You to Saffron Walden* (Harvey's birthplace).

Harvey Sir John Martin (b 1863) actor originally intended to become a naval architect. He made his debut as a boy in 1881 in *To Parents and Guardians*, joined Sir Henry Irving at the Lyceum in 1883 and remained with him for 14 years. Took over the Lyceum management in 1899 and opened with *The Only Way* scoring a great and often revived success as Sydney Carton. Played in Command performances 1902 and 1903 and revived *The Only Way* by royal request in 1907. Has played many Shakespearean rôles and starred in *The Lyons Mail*, *The King's Messenger*, *The Bells*, *Scaramouche* and several Shaw plays. He was knighted in 1921.

Harvey William (1678-1657) English anatomist. Physician at St Bartholomew's Hospital in 1609 he is famous for his discovery of the circulation of the blood (1616) a theory which he explained in his *Essays on the Motion of the Heart and Blood* (1633). He became physician to Charles I in 1630 and attended the monarch during the Civil War. He published a work in 1651 maintaining that every animal develops from an egg (ovum) and was elected President of the College of Physicians in 1654. In 1700 his collected works were issued in 2 volumes.

Harwich [HARIDJ] port at the mouth of the Orwell and Stour Essex 12 m from Ipswich. Its manufactures are cement and chemical fertilisers. Parkeston Quay is the port for mail steamers to Hook of Holland and Antwerp. Dovercourt a popular E coast resort is within walking distance. During the World War Harwich was an important naval station. Pop (1931) 11,000.

Harz [HARHARS] Mountains a range extending in N Germany through parts of Brunswick, Anhalt and Prussia. The highest peak being 3,741 ft. In the vicinity iron, copper, lead and silver are found. There are also a number of medicinal mineral springs.

Hasdrubal (1) Carthaginian general (d. 213 BC) who succeeded his father-in-law Hamilcar Barca as commander of the Carthaginian forces in Spain. He founded New Carthage (Cartagena). (2) Name of Hamilcar's second son who took command in Spain on the departure of his brother Hannibal to the second Punic War. He went to the help of his brother in Italy in 207 but was defeated and killed at the battle of the Metaurus.

Hashish, a drug composed of the dried tops of Indian hemp *Cannabis indica*. It is used in the East to a considerable extent as a hypnotic and can either be eaten or smoked. The active constituent is stated to be an alkaloid to which the name cannabin has been given but the chemistry of this and allied compounds is not known with any degree of accuracy. The preparations of hemp go by various names. Hashish is often applied to a sweetmeat containing the drug. Gunja or ganga are the resin-coated tops of the plants while bhanga is the dried leaves and churris is the resin obtained by scraping the leaves.

The use of the drug in European medicine has been discarded but it is still widely used in Egypt and India. Mild addiction to hashish is apparently not very harmful probably not more so than the average European's use of tobacco and alcohol. The principal

effect of the drug is to cause a loss of all sensation of time, the apparent passage of which is greatly retarded, if sleep is induced pleasant dreams are common. See also ALKALOIDS.

Hastings, county borough and popular seaside resort in Sussex. Its industries are shipbuilding and fishing. It is one of the Cinque Ports. An ancient castle stands on West Hill. Athelstan established a mint here (c. 925). St Leonards is now part of the borough. Pop (1931) 65,190.

Hastings, Battle of (Oct. 14, 1066). Duke William of Normandy (William I, "the Conqueror") totally routed the English under Harold, who was slain. There are no reliable statistics of the battle, but it is supposed that the numbers engaged were from 10,000 to 15,000 on each side. The losses on both sides were great. Also called the Battle of Senlac.

Hastings, Warren (1732-1818), British administrator in India, and first Governor-General. He first went to India in 1750 as a subordinate member of the E. India Company's staff at Calcutta. He made such rapid progress that by 1761 he was a member of council. Three years later he returned home, but in 1769 he went back to India as second in Council at Madras. In 1772 he became Governor of Bengal, and began his great series of reforms in the governmental system, in the law courts, and in the police and military organisations, putting the judicial and financial systems on a new basis. A year later he was made Governor-General. He made enemies among his new council, who were provided with a weapon against him when Nand Kumar charged him with corruption, but was himself found guilty on a charge of forgery, and sentenced to death. In 1780 he fought a duel with Philip Francis, his greatest enemy on the council, and wounded him. After brilliantly suppressing Haidar Ali, Chait Singh, and leaders of other rebellious factions, he resigned in 1785 and returned to England, there to be impeached in 1788 for corruption and

oppression during his Indian administration. After a trial which lasted 7 years and left him penniless, he was acquitted (1795), and granted a pension by the E. India Company.

Hatfield, a market town in Hertfordshire. Agricultural and market-garden produce are the chief marketable goods. It derives some importance from its proximity to Hatfield House, a fine Jacobean building, rich in historical associations, the seat of the Marquess of Salisbury. Pop (1931) (rural district) 11,000.

Hathaway, Anne (c. 1556-c. 1622), maiden name of the wife of William Shakespeare (qv). She was the daughter of a farmer of Shottery, near Stratford-on-Avon, and was 8 years older than her husband, whom she married in 1582.

Hats, see CLOTHING, CARE OF.

Hatton, Sir Christopher (1540-1614), English statesman and Lord Chancellor during the reign of Queen Elizabeth, whose favourite he became. He spoke for the Queen in Parliament attacking Mary Queen of Scots, in speeches, and was a member of the commission which tried her. His social charm and attractive personality won him many royal favours, and he both patronised and practised literature.

Hauptmann, Gerhardt (b. 1862), German playwright, founder of modern German dramatic naturalism. He published his first play, *Der Schuss auf den Grafen*, in 1889. Others of his plays are *Fuhrmann Henschi* (1891), *Die Weber* (1892), and *Der Bismarck* (1893). These social problems made him known as the German Ibsen. His later works are romantic. *Die versunkene Glocke* (1896) and *Die Tante* (1906), are fairy plays. He is known of his other works is *Die Tante* (1912), a novel.

Hausas (*Houssas* or *Hausas*), negroid people, with a mixture of Arab and Fula blood, inhabiting W and Central Sudan. They probably originated from the East, and are influenced by the Arabic and Semitic languages.

apparent in the language. They are peaceable and industrious but make admirable soldiers and police. They spin weave and dye mine salt iron silver and tin and are good agriculturists. Their culture exhibits Mohammedan influence and has flourished since the British occupation of Sokoto. Colonies have spread into Tunis and Italian Libya. They number 5 millions some are Mohammedan in religion though a large number are heathen.

Hausmann, Georges Eugène, Baron (1809-1891) French administrator of German extraction. He entered the civil service becoming in 1819 Prefect of Var and in 1833 Prefect of the Seine. He thus capacity he achieved fame as a rebuilder of Paris, the Bois de Boulogne and the extensive boulevards are based on his plans. He instituted a new system of water supply and sewerage and constructed bridges but was dismissed in 1870 chiefly because of the expenditure of 14 millions incurred. He became prefect for Ajaccio in 1872.

Hausmannite, a naturally occurring oxide of manganese namely triarsenic tetroxide MnO_4 . It is brown black in colour with a metallic lustre.

Haute-Garonne department of S.W. France. Area 463 sq. m. It is mainly an agricultural and dairy farming district. Viticulture flourishes. Its industries the white marble quarries are the most notable. Pop. 150,000. The capital is Toulouse.

Haute-Loire department of S.E. France. The industries are lace, silk, paper manufacture. Despite its mountainous surface much land is under cultivation the crops being wheat, barley, rye and maize. It is traversed by the Loire. There are 2 mines and timber is exploited. Area 1,839 sq. m. pop. 60,600.

Puy is the main town of importance.

Haute-Marne one of the large departments of France. Area 4,000 sq. m. Pop. 195,300. Situated in

the N.E. region of France. A quarter of its area is forest land the remainder being under cultivation with cereals, fruit, vegetables and vineyards. A little iron is mined and building stone quarried. The industries are small with the exception of the cutlery work at Nogent-en-Bassigny. Cloes are made at Chaumont and there are foundries and tanneries in various parts of the department. The springs at Bourbonne-les-Bains are important and popular. Chaumont is the one town of importance.

Haute-Saône, department of E. France. Area 800 sq. m. The industries are varied comprising foundries, glass and brick works, ironmongery, paper making, hosiery and straw hats. Tobacco is grown and a speciality is made of cherry culture, the fruit being used in distilling the liqueur *Kirsch*. There are collieries near Ronchamp. Pop. 216,300. Vesoul and Luxeuil are the chief towns.

Haute-Savoie department of E. France. The manufactures are limited—clocks at Cluses, cotton at Annecy and bell founding at Annecy-le-Vieux. Agriculture is unimportant though poultry and dairy farming with the manufacture of Gruyère cheese are making considerable progress. The timber trade particularly in pine wood is increasing. There are anthracite pits and asphalt mines. The scenery is superb and the climate pleasant. The mineral springs at Evian, Amphy and St Gervais are much frequented. Annecy and Thonon are the chief towns. Area 1,774 sq. m. pop. (1931) 245,300.

Hautes-Alpes, department of S.E. France. It is very mountainous and there are no industries or manufactures of importance. A few sheep and cattle are raised. Chief towns are Gap and Briançon. Area 2,178 sq. m. pop. 87,900.

Hautes-Pyrénées, department of S.W. France on the Spanish border. Apart from its minerals, marble and slate quarries the industries are tanning, flour milling, paper and agri-

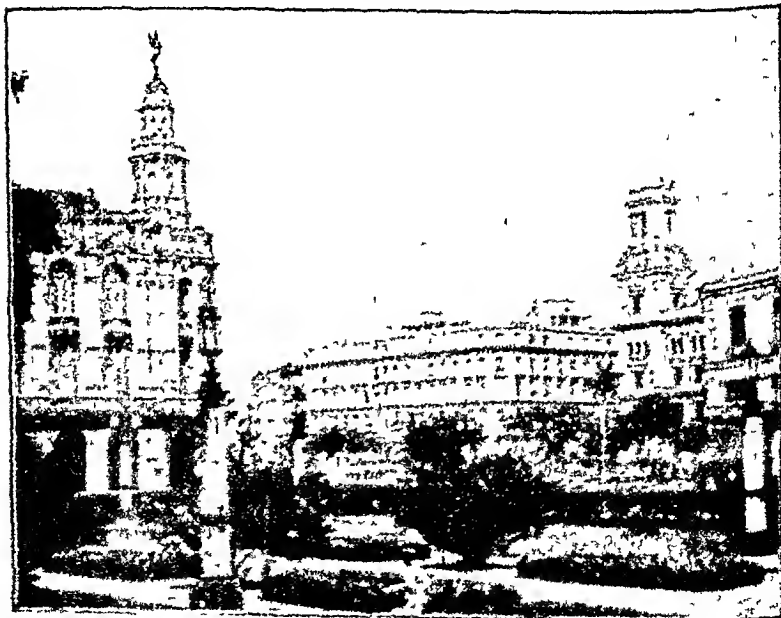
cultural machinery making At Tarbes is an important arsenal Weaving is carried on at Bagnères-de-Bigorre The plains are devoted to agriculture, wheat and maize being main crops It is rich in hot mineral springs Tarbes and Lourdes (*qv*) are the principal towns Area, 1,760 sq m, Pop (1931) 189,993

Haut-Rhin, department of France, formerly the S part of Alsace, restored to France by the Treaty of Versailles (1918) Area 1,360 sq m Pop 490 600 The industries are weaving and cotton spinning, and the manufacture of bricks, tiles, chemicals, paint, and paper Agriculturally the department is well situated, a considerable amount of corn being grown, and quantities of flax The principal town is Mulhouse Pop 186 100

Haut-Vienne, a department of Cen-

tral France One of its chief industries is the manufacture of porcelain at Limoges Apples are grown for cider, and a number of distilleries are engaged in liqueur-making Principal cereals are wheat, rye, and oats There are iron-foundries, tanneries, and dye-works Limoges is the capital, the seat of a bishopric, and a military centre Area, 2,110 sq. m.; pop (1931) 351,300

Havana, capital of Cuba and largest city of W Indies Although cigars and tobacco are the main exports, woollen goods, rum, straw hats, sugar, and coffee are also produced The harbour is large, secure, and fortified. There is a State University The Supreme Court sits in Havana, which was made a Federal district in 1931. Its fine capitol was opened in 1923 It was in Havana harbour in 1898 that the U S Warship *Maine* was blown up,



View of Havana showing domed capitol of the city

an incident that precipitated the Spanish American War. The city was the centre of the revolution of 1933 (see Cuba). Pop (1930) 589 070

Havelock, Sir Henry (1795-1857) distinguished British soldier. He served in the Afghan War of 1839 and the Sikh Campaign of 1845. In 1857 his great victories in the Indian Mutiny reached a climax in the relief of Lucknow where he died soon afterwards.

Haversack (through French from German *Habersack* = a nose bag) originally a bag for carrying oats and other fodder for horses now a canvas bag forming part of the equipment of soldiers and travellers.

Havilland Captain Geoffrey de (b 1884) a pioneer of civil and military

aviation. Began flying in 1909 was founder of the Stag Line Aerodrome at Hendon and the designer of the famous Moth machines. To de Havilland is largely due the increase of civil flying since the World War. He won the King's Cup air race in 1931.

Havre, La Channel port, on the English Channel S. of Dieppe France. Apart from its shipyards the refineries are of commercial importance. There is a petroleum pipeline to Paris. Next to Marseilles Havre is the most important seaport in France.

Hawaiian (or *Samoan* in Islands group belonging to the United States situated just inside the tropics of the N. Pacific Ocean 1900 on W. of Mexico. Of the 19 islands only 8 are



inhabited, Hawaii (the largest, 4000 sq m), Maui, Oahu, Kauai, Molokai, Lanai, Niihau, and Kahoolawe. They are of volcanic origin. Sugar cane, pine apples, coffee and bananas are grown. Wool and hides are exported.

The Hawaiians are now chiefly Christians. Elementary education is free and in English, in public and private schools. Extensive naval works have been constructed at Pearl Harbour, 7 m from Honolulu, by the United States Federal Government to protect their Pacific Coast and the Panama Canal. Steamers communicate with all the islands. There are just over 1000 m of railway, chiefly connecting the various plantations. Telephone systems have been installed on Oahu, Maui, Hawaii, Kauai and Molokai, and wireless operates commercially between the islands. There is a powerful broadcasting station at Honolulu. The Supreme Court sits at Hawaii, the judges being appointed by the President of the U.S.A. There are also local courts.

The islands were discovered by Captain James Cook in 1778, he named them after his patron, Lord Sandwich. In 1803 horses were introduced from America, and 19 years later the first printing press was established. In 1824 the King, Kamehameha II, came to England. His Queen, Kamamalu, died in London, and six days later the King, aged 28, also died. The islands were independent. In 1893 the Queen was deposed, a republic proclaimed, and in 1898, by request, the islands were annexed by the United States. In 1900 they were constituted the Territory of Hawaii, and are represented in Congress by a delegate elected biennially. Administration is by a local legislature, the Acts of which may be modified or annulled by Congress.

The native language has been written only since the coming of the white man, but history in legend, preserved for centuries word perfect, has since been recorded. Hawaiian music and rhythm, with its slurs and

quarter-tones, have proved attractive to the Western ear and are exploited in American films and records. The guitar and ukulele, however, are not native instruments, but adaptation from instruments brought by early Portuguese sailors. The Hula girl with her grass skirt and swaying hips and the surfboard rider are the only truly Hawaiian institutions which have survived. America has spent lavishly in Hawaii, and thousands of wealthy tourists winter there. Area (land and water), 6400 sq m, pop (1930), 368,350.

CONSULT *The Hawaiian Annual* (Honolulu), *Ancient Hawaiian Music*, by S. D. Porteus and M. E. Badcock (Honolulu, 1926).

Hawarden [HAHRDEN], town in Flintshire. Its industries are coal-mining, brick and tile manufacture, iron and chemical works. Its chief claim to fame is that W. E. Gladstone lived at Hawarden Castle. St. Dennis's Hostel and Library was founded by him. Pop. 8000.

Hawes, Stephen (d. c. 1524), English poet, is known solely for his *Passeyne of Pleasure or the History of Graunde Amour and la bel Pucel, containing the Knowledge of the Seven Sciences and the Course of Man's Life in this Worlde* (1506). This is an allegory, treating at great length of the education proper to a knight, and had considerable influence on later writers, especially Spenser.

Hawk, a bird of prey differing from the falcon by the shorter wings and longer tail. The sparrow-hawk (*g v*) is the best-known British species.

Hawke, Edward Hawke, 1st Baron (1705-1781), English admiral. He entered the Navy in 1720, and in 1744 commanded the *Berwick* at the Battle of Toulon, and as rear-admiral in 1747 he defeated the French off Finisterre. His greatest victory was achieved at Quiberon Bay in 1759, when he inflicted a crushing defeat on the French Navy. He was created a peer in 1776.

Hawke, Martin Bladen Hawke, 7th Baron (b. 1860), amateur cricketer,

captain of Yorkshire 1883-1910 and since president of the club. He scored more than 13 000 runs and was noted for his skilled captaincy. He was president of the M.C.C. in 1914 the centenary year and later became hon. treasurer. He toured with English teams in Australia India Canada and the W. Indies. Lord Hawke succeeded to the title in 1883.

Hawker Robert Stephen (1903-1875) English poet published *The Quest of the Sanraal* (1884) and *Cornish Ballads* (1869) including the ballad 'And shall Trelawney die?'

Hawkers and Pedlars A hawk is defined by the Hawkers Act 1888 as a person who travels about selling or exposing samples with a horse or other beast bearing or drawing burden. By the Pedlars Act, 1871 a pedlar is a person who does so without a horse. Both require a licence to carry on the trade. There are exemptions for commercial travellers for the sale of fish fruit and coal and for sales at markets or fairs.

Hawking (or Falconry) The pursuit of game by trained falcons or hawks appears to have been known in China for nearly 4 000 years and in other parts of Asia since c. 600 B.C. It was introduced into England in the 9th century A.D. and remained the most popular sport among the wealthier classes till the middle of the 17th cent. It then rapidly declined chiefly owing to the introduction of fowling pieces for shooting game. It is now of antiquarian rather than sporting interest. It is still extensively practised in the East. During the Middle Ages the type of hawk a man used indicated his social position; the use of the gerfalcon being confined to royalty and the peregrine to the rank of earl.

Hawks have always been classified into two divisions: the long-winged *falcons* or hawks of the lure and the short-winged *accipiters* or hawks of the fist. The hawks used in England include the Greenland Osprey and the Norway

grüne hobby goshawk sparrow hawk and merlin. The peregrine and goshawk are the most generally useful.

The hawk is carried on the right wrist protected by a thick leather gauntlet and is secured by a leash attached to the *jess*, a light leather strap round the bird's leg to which a bell is usually attached. The hawk's head and eyes are covered with a hood which is removed when game is sighted and the hawk slipped. She may be trained to wait on the fly in circles above the falconer's head until game is flushed. Dogs are sometimes used to start the game.

A male falcon or goshawk is called a *tiercel* or *tercel*; the female is always the larger and more powerful. A hawk caught and trained from infancy is called an *eyes*.

The *quarry* in England includes herons grouse black game pheasants partridges woodcock snipe and wild duck also rooks magpies and various small birds such as black birds thrushes and larks. Hares and rabbits may be taken with the goshawk and in Asia even gazelles and small deer are among the quarry. Peregrines or Norway falcons are used for herons which must be flown in open country; the chase usually being followed on horseback. Short-winged hawks may be flown in wooded country. Sparrow hawks are flown chiefly at black birds and thrushes and merlins at larks.

Hawkins, Sir Anthony Hope see HOPE ANTHONY

Hawkins Sir Henry Baron Brampton, see BRAMPTON HENRY HAWKINS BARON

Hawkins (or Hawkyns) Sir John (1613-1693) English sailor. As a young man he made voyages to the Canary Islands and Sierra Leone and was the first Englishman to traffic in slaves whom he seized in Sierra Leone and sold to the Spaniards in Venezuela. In 1574 he was M.P. for Plymouth and became Treasurer and Comptroller of the Navy in the year. For his services

Armada in 1588 he was knighted. He made a fortune in shipbuilding, and in 1590 Frobisher cruised with him to Portugal. He founded the Sir John Hawkins Hospital at Chatham in 1592. He sailed with Drake to the Spanish Main in 1595, dying of fever off Puerto Rico.

Hawk Moths, group of large, swift-flying, diurnal moths, which hover, like humming-birds, over flowers, sipping the nectar by means of their long proboscis.

Hawksbill, see TURTLE.

Hawksmoor, Nicholas (1661-1736), English architect, worked under Wren from the age of 18, and assisted him in the erection of St Paul's. He was Clerk of the Works at Whitehall, St James's, and Westminster, and became Surveyor-General of Westminster Abbey after Wren's death. He built a number of the churches of London, including St George's, Bloomsbury, and also designed the library of Queen's College and other buildings at Oxford.

Hawkweed, a group of wild English plants, several of which, with foreign species, are also cultivated in gardens. They belong to the dandelion family, and are small herbs of several inches to 2 ft high, with heads of tubular florets of conspicuous lemon colour, yellow or orange. The wild species are found on banks and in woods, and the garden species are grown on sunny banks from seed sown in April or roots divided at any time.

Hawthorn, branching thorny shrub or small tree belonging to the family Rosaceæ. The leaves are wedge-shaped, divided into 3-5-toothed lobes, and expand before the flowers, which are white or pink and fragrant. The fruit is red. A variety with double red flowers is grown in gardens, and a double pink in cool greenhouses.

Hawthorne, Nathaniel (1804-1864), American novelist, was a descendant of the early Puritan settlers. Of his many works, the best known are *Twice-Told Tales* (1842), *The House with the Seven Gables* (1851), and *The*

Marble Faun (1860), but his masterpiece is *The Scarlet Letter* (1850), a tragic story in which the influence of his ancestry is most apparent.

Hawtrey, Sir Charles Henry (1853-1923), English comedian, manager, and playwright, first appearance 1881, adapted *The Private Secretary* from the German (1885); last appeared in *Ambrose Applejohn's Adventure*, 1923. Knighted, 1922.

Hay, the stems and leaves of grasses and clovers cut when in full bloom, dried by exposure to sun and wind, stacked, and allowed slightly to ferment. See also HAYMAKING.

Hay, Ian, see BEITH, JOHN HAY.

Hayashi, Tadasu, Count (1850-1913), Japanese statesman and Ambassador to China, Russia, and England. While in London he was one of the chief negotiators of the first Anglo-Japanese alliance, being created viscount in recognition of his services.

Haybox, see COOKERS, CHOICE OF.

Haydn, Franz Joseph (1732-1809), Austrian composer, to whom the development of modern instrumental music is much indebted, wrote during his lifetime over 100 symphonies and over 100 string quartets and trios. Born at Rohrau, Austria, like most great composers he displayed signs of great talent at an early age, and was sent, when 8 years old, to the Cathedral of St Stephen in Vienna as a chorister. After leaving the Cathedral he made a precarious living by giving music lessons, while continuing his own studies. Through the good offices of the poet Metastasio, whom he met in Vienna, he was able to ingratiate himself with the famous master Porpora by becoming his willing servant and at length securing in return the lessons he so much desired. Porpora was able to secure for him more than one post as resident musician to members of the nobility, but Haydn's most important appointment was to Prince Paul Anton Esterhazy, whose *Kapellmeister* he became, and whose family he continued to serve for many years, producing music and conducting orches-

tras at a comfortable salary. The works produced during this period earned him fame abroad and in 1891 he made his first visit to England where he wrote his famous *Salomon* set of symphonies which are among his finest works. Returning to Vienna he began work on his oratorio *The Creation* which had a huge success on its first performance in 1898 and quickly became very popular. *The Seasons* came 3 years later. His health at this time began to fail and though still continuing to compose, he became increasingly weaker making his last public appearance in 1899 at a gala performance of *The Creation* in Vienna. In 1899 he died.

Besides the symphonies and chamber music previously mentioned, Haydn wrote some 50 concertos for piano, violin and cello



Fr. Joseph H. yd

and various other instruments. 3 oratorios, 14 masses, 14 operas, over 60 piano sonatas and much miscellaneous vocal and instrumental music. Apart from its theoretical importance in musical development, Haydn's music has a characteristically fresh and genial melodiousness. The *Surprise* and *Clock* symphonies are among the immortals of music.

Haydon, Benjamin Robert (1786-1846) English painter born at Plymouth. began his studies at the Royal Academy school in 1804 and 3 years later began to exhibit historical paintings of an ambitious character. His work gained little recognition and from 1823 onwards when he was first imprisoned for debt his life became a record of struggle against poverty of disappointed aspiration and of thwarted ambitions until

finally he shot himself. His *Judgment of Solomon* is in the National Gallery and his *Meeting of the Anti Slavery Society* is in the National Portrait Gallery. Haydon will always be remembered for his *41 to 109 aphy* (184)

Hay Fever see ALLERGY

Hayes Rutherford Birchard (18 2 1893) 19th President of the United States. He was born in Ohio and studied at Harvard Law School subsequently practising in Cincinnati. He fought in the Civil War and became President in 1877. In the face of much opposition he withdrew the federal soldiers from the S States thereby effecting a quicker return to normal conditions and did much to eliminate corruption in Government departments.

Haymaking is the harvesting of mown or cut grasses which are subsequently stored and dried for fodder. If hay is wanted for seed the grass must be allowed to mature before cutting while for fodder the crop should be cut when in full flower. In fairly large fields the cutting or mowing machine is worked continuously in a spiral. There are now machines to turn the hay a day or two after it has been cut and after drying the partially withered grass is drawn into windrows by horse rakes and the windrows are then collected into cocks. The cocks are carted to large stacks or hay sheds in which form the hay is stored until required.

Hay barns are valuable innovations consisting of widely spaced pillars bearing a roof and standing on a dry surface of stones or gravel raised some inches above the ground. See also AGRICULTURAL MACHINERY.

Hay Pauncefote Treaty (1901) between Great Britain and the United States amending the Bulwer Clayton Treaty of 1850 regarding the proposed canal between the Atlantic and the Pacific Oceans. The neutralization of the canal is maintained, it is to be always free from blockade and is not to be commanded by fortifications. The policing of the banks is reserved by the United States.

Hayter, Sir George (1792-1871), English painter. In 1816 Hayter became miniaturist to Princess Charlotte, but he is best known to-day for his large paintings of such subjects as *Queen Victoria taking the Coronation Oath*, *The Marriage of the Queen*, and *The Meeting of the First Reformed Parliament*. One of his works is said to contain 189 portraits. He was appointed painter in ordinary to Queen Victoria, and was knighted in 1842.

Hazel (Corylus), genus of shrubs of the order Corylaceæ. Hazels are common in hedges, especially on sand, having coarse, serrated leaves, male catkins, and female flowers with crimson stigmas. The fruit is an edible nut. The wood is used in cabinet-making, the roots in veneering cabinets, and the root shoots for crates, hurdles, hoops, whup handles, and for wattling the space between stakes in a fence.

Hazlitt, William (1778-1830), English essayist, was a friend of Coleridge, Wordsworth, Lamb, and Leigh Hunt. For the last-named he wrote *The Round Table* (1815-17), a series of literary essays, which were published in *The Examiner*. His *Lectures on English Poets* (1818), *English Comic Writers* (1819), *Dramatic Literature of the Age of Elizabeth* (1821), *Characters of Shakespeare's Plays* (1817), and *Table Talk* (1821-2) were important and popular works. He is best known by *The Spirit of the Age* (1825). Hazlitt's style is not of the clearest, but his essays show his wide learning and deep feelings, probably the best known are those on *The Fight and On Walking*.

Head, the part of the body which in the higher animals contains the brain and sense organs. It can be divided into two regions, the face and the cranium, the latter containing the brain. See also ANTHROPOLOGY, CULTURAL.

Headache, pain in the head, often producing great distress and inconvenience. It may be recurrent, even becoming permanent. The seat of pain is usually the brain, but sometimes the skull, scalp, or nerves of the

head and face are affected. Nervous headache affects persons of a nervous temperament who are in poor health or are overworked, and sometimes is produced by atmospheric conditions. *Migraine* is a severe variety affecting particularly those who are intellectual. It usually affects only one side of the head, and may be accompanied by nausea and vomiting, and bright spots appearing in front of the eyes. Severe cases may last a week. The first attack comes on before the age of 25 and may be repeated at intervals, but they usually cease between 50 and 60. Treatment is to take light nourishing food, plenty of rest, and avoid worry and strain. Tonics, such as arsenic or quinine, may be taken, with bromides, during the attacks.

Sympathetic headache is produced by some disorder, such as dyspepsia (qv) or bad teeth, occurring in any other region of the body. In children it is most commonly caused by eye strain. It disappears when the cause is removed. *Anæmic* headache occurs in those who suffer from anæmia, heart disease, hardened arteries, or Bright's disease. It generally affects the top or back of the head and is accompanied by irritability and depression. Alcohol gives great temporary relief. Heart stimulants, iron, and good food should be given. *Hyperæmic* headache is accompanied by a flushed face and throbbing in the vessels of the head. It may be produced by hard work, irregular meals, too much alcohol, or excitement, especially in those people who have suffered a head injury. Headaches due to too much good living are of this type. Alcohol should be abandoned, coffee and tea taken sparingly, and a light diet of white meat, fish, and fruit instituted. The bowels must be kept working regularly. Cold water applied on a cloth to the head gives relief. *Toxæmic* headache is due to some poison in the blood, often produced by fevers, influenza, or a cold, sometimes by constipation, or inhaling poisonous gases. Treatment consists

in removing the cause of poisoning. Other forms of headache are gouty headache, rheumatic headache accompanied by great tenderness of the scalp, and organic headache due to disease of the brain itself.

Health, Bill of, a document given to the master when a ship is leaving port. According to whether there is an infectious disease in the port or not, the bill is clean, suspected, touched, or foul. In the latter even the ship is liable to be quarantined in the next port.

Health Insurance, a compulsory national scheme to secure free medical attendance and compensation for lost wages to all insured workers during sickness. Such a scheme was introduced in Germany in 1883 but was not adopted in this country until the passing of the National Insurance Act 1911. The costs like those of Unemployment Insurance are contributed by the worker, the employer, and the State. All wage-earners with the exception of non manual workers receiving over £250 a year and a few industries with their own schemes are included. About 17½ million persons are so insured. The present rate of weekly contribution is 1s 6d for men (3d payable by the employer) and 1s 1d for women (7d payable by the employer). In Northern Ireland the sums are 1s 4d (8d) and 11d (6d) respectively. Half of any arrears due to unemployment are excused. Sickness benefits are as follows: sickness—men 15s, spinsters and widows 12s, married women 10s; the rates are reduced to 9s for men and 7s 6d for women where less than 104 weekly contributions have been paid. Disablement—men 7s 6d, spinsters and widows 6s, married women 8s, maternity 40s. Insurance is usually administered through an approved society which may be able to offer additional benefits for dental and other treatment. The total receipts under the scheme for Great Britain and Northern Ireland in 1931 were £41 millions; the expenditure on benefits

was £34 millions; the cost of administration £6 millions. Funds to the extent of £178 millions stand to the credit of the scheme and the approved societies.

Health Ministry of a department of State created in 1919. It supervises local government and the bodies responsible therefor and deals with National Health Insurance, Old Age Pensions, adult ration of foodstuffs, provision of baths and wash houses, bakeries, cemeteries, crematoria, the well being of children living in canal boats, the housing of the working-class, care of the blind, the deaf and dumb, lunatics and the mentally deficient, maternity and child welfare, registration of birth, deaths and marriages, inspection of nursing homes, town planning, water supply, slum clearances and a host of other important duties. Its head, the Minister of Health, is invariably a member of the Cabinet. It supplanted the former Local Government Board.

Healy, Timothy Michael (1835-1931), Irish politician and lawyer. In 1880 he was elected M.P. for Wexford and at once made his mark in the House of Commons by his fearless and witty oratory. In 1884 he was called to the Bar. Originally a friend and protégé of Parnell, he later became one of his bitterest opponents. In 1900 his opposition to the United Irish League caused his expulsion from the ranks of the Nationalists to which, however, he later returned. He retired from Parliament in 1918 but reappeared in public life again in 1921 when he was appointed Governor-General of the newly founded Irish Free State. He resigned in 1927.

Hearing see EAR, SOUND.

Hearn, Lafcadio (1850-1904), author, was the son of an Irish father and a Greek mother. He spent some time in America but ultimately settled in Japan in 1891. There he spent the remainder of his life as Professor of English at Tokyo. His works include many books on Japanese history and

customs—e.g. *Glances of Unfamiliar Japan* (1894), *Gleanings in Buddha Fields* (1897), *A Japanese Miscellany* (1901), etc. They are marked by an extremely beautiful prose style. After his adoption of a Japanese name and citizenship and his conversion to the Buddhist faith, his life was less happy. *Japan, an Attempt at Interpretation* (1904) belongs to this period. See *Life and Letters*, by Elizabeth Bisland.

Hearse, a vehicle for conveying a dead body to its burial-place. The hearse was originally a triangular framework for holding ceremonial candles at a Church service, but the 15th-cent practice of erecting splendid canopies of iron and brass, set with candles, over the bodies of famous people while lying in state in the church, caused a gradual change of meaning to the present sense.

Hearst, William Randolph (b 1863), American publisher, founder of the largest newspaper firm in the world, began by editing the *San Francisco Examiner* in 1887. In 1895, he purchased the *New York Morning Journal*, an unsuccessful paper, which he quickly raised to the front rank by sensational methods. He expanded his interests until, in 1925, 25 newspapers belonged to him. His publications now include magazines, and he is interested in films.

Heart, The. This organ is composed of a pair of hollow muscular tubes placed side by side, its function being to propel blood on the one side into the lungs, and on the other, into the general circulation of the body (see CIRCULATORY SYSTEM). Each of the two sides of the heart is divided into sections or "chambers"—the auricle, which receives the blood from the veins, and the ventricle, which receives it from the auricle and drives it to the arteries. The walls of the ventricles are thick and muscular, while those of the auricles are thin and less muscular. The heart pumps blood through its chambers by a process of alternate contraction and dilatation, known as systole and diastole. The

direction of flow is controlled by valves, of which there are two sets on each side of the heart. The first set lies between the auricle and the ventricle, and their purpose is to prevent blood from flowing back into the auricle when the ventricle goes into systole, or contraction. The second set lies between the ventricle and the artery into which it is pumping blood, to prevent regurgitation of the blood back into the ventricle when the ventricle goes into diastole, or relaxation. The valves take the form either of two or of three cusps which hang loosely while the blood passes forwards through the valve, but flap back into apposition when the blood tends to flow backwards.

The beat of the heart does not take place simultaneously throughout the organ, but occurs in a definite "cycle". Firstly, the auricles relax (auricular diastole), and during this time, the blood flows into them from the veins. They then contract (auricular systole) and drive blood past the valves into the relaxing (or diastolic) ventricles. Secondly, the ventricles contract (ventricular systole), and the valves through which the blood has just passed flap back into apposition, so that the blood is forced forwards past the second set of valves. The ventricles now go into diastole, and receive more blood from the auricles, again in systole. If the ear is placed on the left side of the chest above the heart, the heart-beat can be heard—"Lub-Dub," "Lub-Dub." The "Lub" corresponds to the vibrations caused by the closing of the first set of valves, the "Dub," to those caused by the second set.

There are many diseases of the heart which resemble one another in that they affect the valves, and are for this reason termed valvular diseases. The valves may become affected in two ways, either they will not close properly, or else they will not open widely enough, the two conditions being called incompetence and stenosis respectively. The consequences of incompetence are that the blood is able to regurgitate

back into the heart from the arteries and back into the auricles from the ventricles. The consequences of stenoses are that the blood cannot be pumped through or out of the heart with normal ease. In both cases the heart chambers undergo abnormal dilatation, and the walls also become thickened in order to perform the extra work involved in pumping.

These defects of the valves can be detected by listening to the heart sounds, which are altered in character. The presence of these defects, however, can also be reasoned from various symptoms in the body. These result from a slowing of the net rate of flow of blood through the heart. The veins are over-filled and distended, the arteries are not full enough.

Heart failure is, however, an occurrence which results from many other things than valvular disease. Bacterial poisons, non-bacterial poisons, and lack of proper nutrition all affect the heart muscle in an adverse manner. Of the bacterial poisons those occurring in acute rheumatism, diphtheria, syphilis, typhoid, influenza, pneumonia, are every-day examples. Of the non-bacterial poisons, arsenic, phosphorus, and more commonly alcohol, are typical. Lack of proper nutrition may result in one of two ways. The heart wall contains small arteries which supply it with blood. If these become diseased then the blood supply to the heart wall becomes inadequate and the muscle fails for reasons of local anæmia. In the other case however there may be a very severe anæmia of the whole body and the heart muscle fails with all the other tissues in the body because of the general anæmia. The degree to which the heart fails varies considerably according to the cause. In the case of diphtheria the heart may become very weak indeed but provided the patient lives, it always returns after convalescence to its normal and comparatively healthy state. In the case of rheumatic fever or syphilis, the damage done is permanent. The disease may

be arrested or become dormant after treatment but the heart never returns to normal. Apart from damage to valves or to muscle there are conditions in which there is damage to the nerves which control the heart. The reason for the normal difference in timing between auricular and ventricular systole is that the two movements are initiated by the same nervous impulse and this reaches the auricle first and then travels on to the ventricle. The auricle always contracts and sends blood into the ventricle before the ventricle contracts. Occasionally the normal routine may become deranged. There may be occasional additional single beats in the auricle. These may become more numerous producing paroxysmal series of beats in rapid succession. They may become so rapid as to leave the auricle no time to relax after each contraction and then ensue a condition of prolonged auricular flutter. This may develop into a permanent condition known as auricular fibrillation. When this happens the ventricles commence to beat in their own time entirely independent of the auricles. Instead of rapid beats the beats may be so slow as to be inadequate to supply the brain with sufficient blood and lapses into unconsciousness will occur between the beats.

Heartburn, a feeling of heat and discomfort in the chest and pit of the stomach which irritates the wall of that organ. A dose of bicarbonate of soda is the best remedy. A simple diet should be taken.

Hearth, place where a fire is built. This term may be used of an open fireplace in a house, the furnace in a smithy or the furnace used in the steel and iron industry—known as an open-hearth furnace—the construction of which is a highly technical process.

Hearth Tax, a tax of 2s imposed in 1662 on every hearth in all houses except cottages. It proved an unpopular measure and in 1695 was superseded by a window tax (q.v.)

Hearts, a modern card game for from 2 to 6 players. In the four-handed game a full pack of 52 cards is used, and the whole pack dealt out 1 card at a time. In two-handed Hearts each player receives 13 cards. With 3 players the two of spades is discarded, when 5 play, both black twos, and when 6 play, all 4 twos are discarded. The object is to avoid taking tricks containing hearts. There is no trump-suit. At the end of a hand each player counts the number of hearts in the tricks he has taken, and pays for them in some prearranged manner, e.g. 1 counter for each heart, the pool to be taken by any player having no hearts, or by the face-value of the cards, ace counting 14, king 13, queen 12, and jack 11 (*spot hearts*). Another method is for each player to pay into the pool as many counters for each heart taken as there are players besides himself, and then withdraw 1 counter for every heart not taken.

Heart's Ease, see PANSY

Heat. We are made conscious of the existence of heat by the direct evidence of our senses, since our skin is provided with nerve-endings which tell us when it is being heated or cooled. The more heat we add to a body the hotter it becomes. We thus get the notion of temperature as intensity of heat.

The properties of heat can be much more adequately understood if we suppose it to be the rapid motion or vibration of molecules. This has an important bearing on the *Kinetic Theory of Matter* (*q.v.*), and on *Thermodynamics*, the science of the relation between heat, mechanical work, and other forms of energy. In this article we shall deal only with such phenomena of heat as can be considered without reference to the real nature of heat.

We find that a body expands as it acquires heat. This principle enables us to measure the degree of heat contained in a body, in other words, its temperature, the mercury thermometer being a familiar example (see TEMPERATURE, MEASUREMENT OF).

By its means we find it possible to verify the first law of heat, namely that heat passes by conduction from a body at a higher temperature to one at a lower temperature. If we bring two bodies which are at different temperatures into intimate contact, the colder one becomes warmer and the warmer colder, the final temperature being uniform.

We define a 'quantity of heat,' by selecting some substance as standard, and taking the amount of heat required to produce in it a given rise of temperature as our unit of quantity. For the measurement of quantities of heat, or "calorimetry," as it is called, we take water as the standard substance, and define the unit of heat to be the amount necessary to raise the temperature of 1 gramme of water from 15° to 16° C. We call this "calorie." As this is a small quantity, the kilogram-calorie, 1,000 times greater, is often used as a practical unit.

A characteristic property of heat is its conduction by bodies. Heat we can define the "conductivity for heat" of a body. This specific conductivity for heat varies very greatly from one substance to another. Metals are good conductors of heat. Copper and silver conduct heat nearly 7 times better than iron, but iron conducts heat c. 700 times better than silk or flannel. Non-metallic substances generally, such as glass, wood, porcelain, conduct 100-1,000 times less than metals, while cork is c. 10,000 times less conducting than iron.

Liquids also conduct heat, but liquids such as mercury being very good conductors, but ordinarily we think of a liquid as heated, as in a vessel over a flame, conduction takes place only across a very thin layer of the liquid, wetting the inside of the vessel. Beyond this the liquid, as it receives heat, rises upwards in the vessel, and is replaced by an inflow of cooler liquid. This process is called "convection." Gases are very poor conductors of heat, nevertheless, a mass of gas

rapidly heated by convection when the source of heat is suitably situated.

Radiation forms a third method by which heat passes from one body to another. When we have a stove burning strongly in a room we are able to feel the heated air streaming up from it and the air of the room is heated by convection. But at the same time we feel a direct flow of heat in all directions from the stove a flow which may take place through cold air without perceptible heating effect on the latter. Bodies radiate heat at all temperatures and the same law applies to transference of heat by radiation as in the case of conduction namely that heat is by this means only transferred from a hot body to a cold body and not vice versa. The matter is dealt with fully in the article RADIATION.

As much as the addition of heat to a body may cause it to change its state e.g. from solid to liquid or from liquid to vapour the nature of heat as a mode of motion of the molecules of bodies is obvious the firm structure of a solid will break up when its particles are set in sufficiently violent vibration and since the attraction between particles differs from one substance to another so also will substances melt at differing temperatures. The motion of the particles of a liquid receiving heat may finally become so violent as completely to overcome the force which holds them together and to allow them to fly around with sufficient violence to exert on the walls of a vessel a pressure like that of a gas and the liquid is said to boil. The Kinetic Theory of Matter (qv) has resulted from a study of these and related phenomena but we may here deal with some of the simple facts of change of state.

If we heat very cold ice it warms up steadily but when its melting point is reached it ceases to warm up as we supply heat and commences to melt. As much heat is needed to melt it as would raise the temperature of the water produced by 80 C. This heat is called the latent heat because it is

imagined as latent in the water and is in fact evolved again when water freezes. Melting continues as heat is supplied and not until the whole is melted does the temperature again begin to rise.

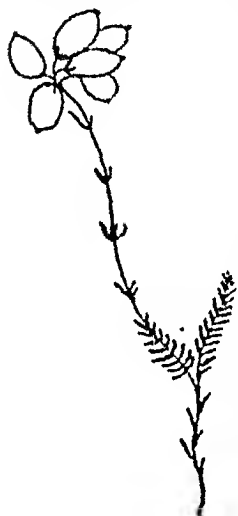
It is obviously easy to measure the latent heat of a solid by methods similar to those employed in measuring specific heat. That of water for instance is easily found by adding a weighed quantity of ice at its melting point to a considerably greater weight of warm water the ice melts completely and a simple measurement of the final temperature enables us to calculate how much heat has been involved in the process.

The latent heat of bodies is of great use when it is necessary to maintain constant temperature. Steam from water boiling freely has a constant temperature upon which fact a good deal of domestic cooking depends. It should be noted however that the temperature of steam varies considerably with variation in pressure of the atmosphere. The melting point of ice also varies slightly according to pressure.

The increase in the boiling point of water with pressure has important practical applications. It is used almost daily in various types of cooker in which the escape of steam is hindered so that the temperature rises above the ordinary boiling point and cooking is effected more rapidly. Many types of technical and commercial apparatus are employed in which in the same way water vapour is applied in order to heat substances to temperatures considerably above normal boiling point. Modern steam boilers work at very high pressures indeed and since the efficiency with which the heat is utilised is the greater the higher the temperature every effort is made to increase the temperature and pressure as far as available materials will allow.

See also GASES LIQUEFACTION OF KINETIC THEORY and REFRIGERATION.

Heath (or *Heather*), wild plants of the order *Ericaceæ* (q.v.), found on moors, heaths, and cliffs, with much-branched



Cross-leaved Heath

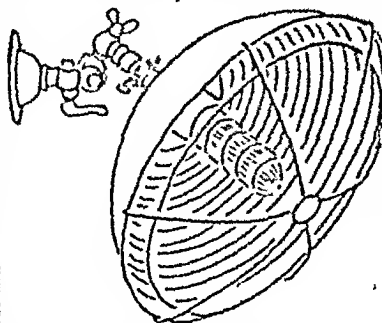
Dorchester, 1543 Accepting the early reforms of Edward VI, he was deprived of his see and imprisoned in 1551 for rejecting the Ordinal of 1550, regulating the consecration of bishops. Under Mary he became Archbishop of York, 1555, and Lord Chancellor. He was deprived of his see in 1569 by Queen Elizabeth for refusing to accept her supremacy in the Church.

Heating, Electric. High-temperature electric heating is described under **ELECTRIC FURNACE**, but the use of electricity to produce low-temperature heat, mainly for domestic purposes, is rapidly increasing, owing to its great convenience, and in spite of its cost. Although the heat is usually required at a low temperature it is necessary that the actual heating units should be run at a fairly high temperature, in order that the heat may be communicated to the heated object as quickly as possible. It is only recently that sufficiently durable and cheap heating

stems, small needle-shaped leaves and spikes or clusters of purple bell-shaped flowers. Cultivated varieties require sandy soil and a fair amount of water.

Heath, Nicholas (c. 1500-1578), Archbishop of York (1555-9). After being sent on a mission to the German Lutheran Princes in 1535, he was made Bishop of Rochester, 1539, and

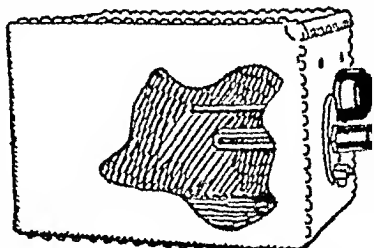
resistances have been available, the chief of these is an alloy of nickel and chromium, known as *nichrome*, which can be heated by a current to brief



Reflector Wall Bracket Radiator

redness in air for long periods without serious oxidation. Radiators consisting of spiral resistances of this wire set in front of concave reflectors of untarnishable material such as chromium-plated metal or stainless steel are now very common and much like on account of their cheerful appearance and the fact that they do not pollute the air.

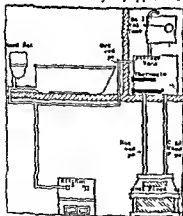
Electric cooking appliances comprise kettles and saucepans with built-in resistances, electrically heated ovens and hot-plates, which are smooth flat sheets of metal electrically heated. Their efficient use requires that the



Electric Hot point which heats water by contact. Utensils heated by them should be clean, smooth, and flat on the bottom, as otherwise the transference of heat is inefficient.

Electricity is supplied at a very low rate for heating water which is contained in a large very well insulated tank. This enables the water to be heated from cold by a moderate current and kept hot by a very low one. The control is automatic and the cost does not greatly exceed that of gas heating. Another type of heater is the *immersion heater* the heating resistance being carried on a rod which is used to stir the water or other liquid to be heated. This form of heater is highly efficient as practically no heat is lost.

Heating of Rooms The English climate makes it necessary for living rooms to be provided with some sort of heating apparatus which can be brought into use for seven or eight months in the year. It is also occasionally necessary for bedrooms to be provided with artificial heat and often desirable for halls passages and lan-
ings to be similarly equipped. The

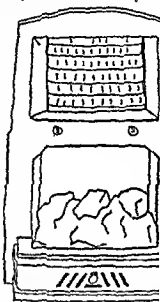


Sectional diagram showing modern domestic central heating system. Hot and cold pipes pass through an ordinary coal fire boiler carrying the water to the radiator.

four main forms of heating are by coal, coke, wood or peat, by gas or by

by one fire is a logical method of solving the problem although it has its disadvantages.

By Coal etc. Modern open fire



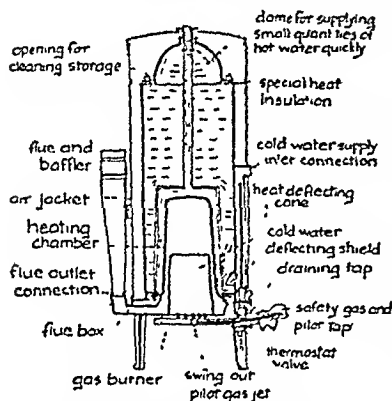
Modern Coal Grate.

simple and dignified in appearance, scientifically designed and saving in construction. The surfaces are colourful, frequently of stone, sometimes tiles with an enamel face matt or shiny. Fusion ware is durable and attractive, will never chip. Modern mantels are often small, consisting merely of a tiny shelf formed by the projection of the tiled framework.

Brass fenders are occasionally placed by an earthenware kerf, containing an adjustable air inlet. Fires burn on a raised hearth without a kerf.

The actual fire grate consists of cases of fire-clay blocks heated

causing less dust and healthier atmosphere, require ample pre-heated air to burn in an open grate. An inexpensive fitting is on the market for



Section of Water Heater for Room Heating

ordinary coal grates, supplying the necessary draught. Old fire-places can thus be reconstructed for complete combustion.

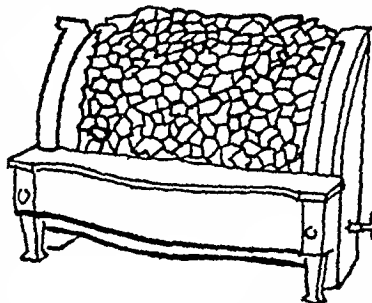
For rooms and halls in continual use, or where danger of fire is great, a closed stove is best, giving slow continuous heat, requiring little stoking, and keeping in overnight. Placed in the centre of the room in continental fashion, the stove radiates heat from a pipe connecting it with the outer wall.

Coke, anthracite, and smokeless fuels are suitable in all such stoves, some burn coal also. They can be adjusted as a slow fire, or will burn up brightly if required. They cost 3s-5s a week for fuel.

By Gas. Heating by gas received a big impetus with the introduction in 1906 of the upright radiant heater, in which a series of gas-jets burns inside grilles of clay and metallic oxide which glow brightly when heated. Research since then has been directed to improving this type. A slight chemical change in the composition of the radiant increased its heating value, better mixture of air and gas reduced

fumes, the introduction of flues above built-in stoves has given a good room draught almost as effective with a coal fire, the radiant heater, however good, requires cleaning from time to time, and broken radiators should be mended at once to prevent wastage and danger from fumes. Gas fires are made in portable sizes, and can be plugged to a socket as easily as an electric heater. Best of this style is the bowl fire, with a single radiant in the centre of a copper bowl which reflects and concentrates the heat. A tiny bracket heater of this type can be used in small rooms with no space for floor-space. Imitations of coal fires are made with the gas heater behind a black cover representing lumps of coal. Another type resembles glowing coals. Coloured stoves help to brighten a modern room and harmonise with the decorative scheme.

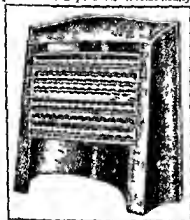
By Electricity. The best known electric heater is the bowl type with its circular reflector for local heating. A similar design is used as a ceiling radiator, especially in bathrooms and small rooms where floor space is scanty. Portable fires radiate heat from flat-bar or clamp-in elements more efficiently if the actual elements are curved. A swivel wall heater



A Gas Fire in imitation of a Coal Fire hidden from view, reflects heat from a shiny copper surface. One portable model, with a chromium-plated reflector, has the back decorated as

screen and is reversed in the grate when out of use

An electric fire can be fitted into existing fire places without structural alterations to tone with any furniture and decorative scheme. It may be moved out in an emergency to another room. Continuous luminous heat for warming the air gently is given by a lamp element in a copper reflector. For slow controlled heating as in halls and nurseries where a circulating system is impracticable the electric tubular heater is effective. The temperature is kept even automatically



Elctrol Don the Heater

and there is no danger of fire. This style can be disguised as a wall panel inconspicuous under a coat of heat resisting paint of the correct shade but efficient. Electrically heated water radiators are most satisfactory of all and can be made quite small and decorative to fit on a wall shelf. A heater and grill is useful in bed sitting rooms. A reflector plate is inserted under the element when room heating is desired.

By O I. An oil burning stove is cheap in cost and running expenses. The small models are portable and give a good heat for their size. New shades in colouring make them

most attractive. A stove burning vapourised paraffin can be used for light cooking then converted simply to form an excellent radiator. In the country where there is no gas or electric installation oil is the only alternative to the fuel burning grate.

Heaven the English word meaning the firmament about the earth. In certain religions e.g. that of Babylonia there were several heavens the abodes of various Gods. In the Hebrew and Christian religions the word had come to mean the dwelling place of God and in Christian eschatology (q.v.) the ultimate destination of those who are saved.

Heavenfield, Battle of (a little N. of the Roman wall A.D. 634) the Anglo-Saxons under Oswald of Bernicia inflicted a crushing and final defeat on the Britons under Cadwalla who lost his life. Also called the Battle of Deanesburn.

Heavyside Layer see BROADCASTING.
Hebbel, Christian Friedrich (1813-1863) German dramatist and poet of humble birth first became known for his tragedy *Judith* (1841). His most important work is *Maria Magda* (1844) a tragedy in prose dealing with the lives of ordinary folk that foreshadowed Ibsen. His other tragedies include *Julia* (1851) and *Die Nibelungen* (1863). His lyrics were published as *Gedichte* (1841) and *Neue Gedichte* (1848) and he also wrote a diary that has been printed.

Hebe (Ἥβη) in Greek mythology the daughter of Zeus and Hera was the goddess of youth and cup bearer to the gods until she was replaced by Ganymede (q.v.). She later married Heracles. In Rome she was worshipped as *Dia* or *Juventas* (youth) and is represented as a young virgin decked with flowers.

Heber, Reginald (1783-1820) English hymn writer was made Bishop of Calcutta in 1815. His hymns include *Holy Holy Holy Lord God Almighty From Greenland's Icy Mountains* and *The Son of God goes Forth to War*.
Hebrew Language. A Semitic

language (*qv*) which was developed by the Israelites in Canaan, and became the language of the Jewish sacred literature. The alphabet is developed from that common to all Semitic languages, and is written from right to left. For a description of its later use and development see HEBREW LITERATURE.

Hebrew Literature. Applied to literature in the Hebrew language or writings originally in Hebrew, but now surviving only in translation. The earliest literary monuments are comprised in the Old Testament Scriptures and various apocryphal books, the latter of which are for the most part represented only in translations.

The knowledge and use of Hebrew has doubtless been continuous. After the close of the Biblical Canon, the oral traditions regarding law and usage, common among the Jews in Palestine, underwent steady development. They were finally redacted and written down c. the 2nd cent. A.D. These are known as the *Mishna*, and are in a pure Hebrew, with but a small admixture of foreign terms. Apart from the *Mishna*, there grew up the *Midrashim*, a series of commentaries and homilies on the Scriptures, in Hebrew. The *Gemara*, a comprehensive commentary on the *Mishna* produced in Aramaic, forms, together with the *Mishna*, what is known as the *Talmud*.

Although the main body of post-biblical Hebrew literature was, until recently, religious or legalistic, it comprised also a considerable output of scientific work and belles-lettres. There was a succession of liturgical poets whose hymns and psalms have been incorporated in the Hebrew prayer book, plays, and satires as exemplified in the works of Emanuel de Romi (a contemporary of Dante) as well as innumerable philosophical treatises in Hebrew, dictionaries, and grammars. It says a great deal for the flexibility of Hebrew that its vocabulary kept pace with the demands made upon it, new words and expressions appearing

as in the case of other living languages.

The rise of the Zionist Movement (1897) and its adoption of Hebrew as the language of profane use in Palestine assured for all time the permanence of the Hebrew language. Under the genius of the great Hebrew lexicographer Eliezer ben Yehude, it blossomed into new life, proving itself adequate to modern needs. In Palestine to-day Hebrew is the language of the new literature, of the Press, the theatre, and every branch of Jewish life. Modern Hebrew has also been the medium of a valuable literature, notably the work of the modern Hebrew poet Ch. N. Bialik, the essayist Achad Ha'am, and a whole array of novelists and writers on topics ranging from the abstruse to the commonplace. See Abrahams, *Short History of Jewish Literature* (1906).

Hebrews, see JWS.

Hebrews, Epistle to the, book of the New Testament of unknown authorship, its ascription to St. Paul being now generally discredited. Its teaching stresses the universal character of the Church as opposed to the Judaizing tendencies that existed amongst Christian Jews. Its main theological importance is in the expression of the doctrine of the Incarnation and its implications.

Hebrides [HEB'RIDEZ], The, the W. Isles of Scotland, fringing the Atlantic coast for c. 200 m. from the Firth of Clyde to the W. coast of Sutherland. The archipelago is divided into the Outer and Inner Hebrides, separated by the waters of the Little Minch, and comprised in the counties of Argyllshire, Inverness-shire, and Ross and Cromarty. The two groups are fairly distinct geologically. The Outer Isles, of which Lewis-with-Harris, N. and S. Uist, Benbecula, and Barra are the chief, are denuded humps of gneiss. The Inner Hebrides (Skye, Eigg, Coll, Rum, Mull, Staffa, Iona, Jura, Colonsay, and Islay) have been invaded by volcanic "traps," especially in the N. Skye (*qv*) and the more N. isles are mountainous, the cultiv-

able area everywhere is small and moors and peat bogs cover most of the surface. There are extensive deer forests in the larger islands. The climate is very wet. Sheep- and cattle raising are the principal occupations. local tweeds and whiskies both have great reputations. Skye is the largest island and Lewis with Harris the most populous. Area 2800 sq m. pop. c. 0000.

Hebron, a town in Palestine c. 16 m. S.W. of Jerusalem. It was taken by Joshua and bestowed upon Caleb. In 147 B.C. it became the first capital of David who was anointed king there. It was destroyed by Vespasian in the 1st cent. and in the 11th cent. taken by the Crusaders from whom it passed to the Moslems in 1187. Its main industries are glass and leather work. It has steadily diminished in importance since 1919 when it was the scene of a massacre of Jews by the Arab. of Hebron resulting in the evacuation of the city by the Jewish residents. The traditional site of the Cave of Macpelah containing the tombs of the Patriarchs attracts many visitors. Pop. (1931) 1753.

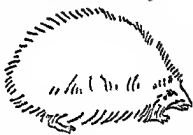
Hecate [ha.ko'te] in classical mythology formed with Proserpine and Diana a kind of female trinity (*dio-triformis*) whose statue was placed and worshipped at crossroads (*trivia*). She was the goddess of magic and witchcraft and as such was represented with three heads, a horse, a dog, and a bear.

Hector in classical legend the chief champion of the Trojans against the Greeks. He was one of the most valiant of ancient heroes but was slain by Achilles who dragged the body behind his chariot round the walls of Troy. The *Iliad* ends with an account of the funeral rites of Hector.

Hecuba, in classical legend second wife of Priam king of Troy and mother of Hector, Paris, Cassandra and others. At the birth of Paris (*qv*) she was warned in a vision that he would cause the destruction of Troy and she vainly tried to avert

this by leaving the child exposed on Mt. Ida to die. After the fall of Troy Hecuba was given to Ulysses and was taken by him to Crece; she escaped but in her flight was changed into a dog. She then threw herself into the sea at a place which became known as Cyneum (*Gr. Avon* = a dog).

Hedgehog (or *Urchin*) the largest species of the order *Insectivora* (*qv*) distinguished by its armour of sharp erectile spines and by its habit of rolling into a ball when disturbed. Hedgehogs are nocturnal and feed mostly upon insects but also eat eggs and small animals including adders.



Hedgehog

The long-disbelieved story that they suck cows resting in the meadows at night has recently been proved to be true. Several related species are found in Africa and India.

Hedge-sparrow, an elegant little British soft-billed bird somewhat like a sparrow in colour but not related to it, being akin to the robin and wheatear. It is a resident species and is commonly victimised by the cuckoo.

Hedra, Even Anders (b. 1865), Swedish geographer and traveller. He began his travels in 1885 with a visit to Persia and Mesopotamia which he revisited in 1890 as a member of the Swedish Embassy. He has travelled widely in Turkestan through Asia from Tibet to Peking across the Gobi Desert and over the Himalayas to India and through W. China. He was honoured by the King of Sweden in 1904 and is an Hon. D.Sc. of several

universities. He has written many books, some translated into 12 languages, including *From Pole to Pole* (1911, 14 languages), *Trans-Himalaya* (1909), *Mount Everest* (1922), *My Life as an Explorer* (1925), *The Gobi Desert* (English translation 1931), and *Jehol, City of Emperors* (1931).

Hedjaz, see ARARIA

Heem, Jan Davitsz van (c. 1570–c. 1632), Dutch painter, generally considered one of the greatest masters of still-life painting in the Dutch school. His canvases generally represent great masses of fruit with ornamental china and flowers, presenting the opulent appearance characteristic of Dutch painting of this genre at the time. One is in the National Gallery.

Heemskerk, Maerten Jacobsz (1498–1574), Dutch painter, known alternatively as Maerten Van Veen. Heemskerk studied at Haarlem and Delft, but later went for some years to Italy, and his study of the works of the Italian masters considerably modified his earlier style, which had been greatly influenced by the painting of Mabuse. He produced large numbers of paintings, many examples of which are contained in the galleries of Holland. The Fitzwilliam Museum at Cambridge possesses a self-portrait by Heemskerk, and another of his works is at Hampton Court.

Hegel, George Wilhelm Friedrich

(1770–1831), German philosopher. While private tutor at Berne, he studied Christianity from the original sources. He wrote a life of Christ, in which he ignored the miraculous element, and represented



George Hegel.

the Saviour as the naturally born son of Mary and Joseph. Hegel found some-

thing higher than moral teaching in Christ, and that something seemed to



Hegel's birthplace, Stuttgart

be Christ's expression of the infinite in the finite.

Hegel's political activities were coloured by his conception of the essential oneness of human existence and the inter-connectedness of things religious and things secular. In 1818 he accepted the Berlin Chair of Philosophy, where he remained until his death.

Hegel's philosophy is considered the most difficult of all systems. In the *Phenomenology* he treats of 6 attitudes—consciousness, self-consciousness, reason, spirit, religion, and absolute knowledge. To him philosophy is not art but work, not a hiding behind idealism, or a tirade against the world's deficiencies, but the spirit's strife to labour in a world of spirit, to externalise itself, and become one with man and his aspirations, albeit spiritual. It is a realistic idealism, a practical system rather than a vague dream. Man, with all his imperfections and limitations, may approach

perfection and limitlessness his consciousness may be forced from one rampart to another till it takes its final stand in the impregnable tower of absolute wisdom

Beyond and greater than the daily life soars the realm of art which carried a step forward becomes man's perception of the religious life Hegel's philosophy was but poorly received in his own country but in England and Scotland both its theory and practice took a strong hold on thought and quite a strong Hegelian group grew up in the middle of the 19th cent. Hegel's theory of the State and of the relation of the individual to the race played a large part in the formation of the philosophical teaching of Marx (q.v.) (See also AESTHETICS)

Hegemony the leadership or paramount position of one State in a group or federation e.g. of Athens or Sparta among the Greek city States

Heidelberg university city on the Neckar Baden Germany Its main industries are brewing the manufacture of surgical and optical instruments cigars and publishing Its famous university was founded in 1386 by the Elector Rupert I The two most interesting buildings are the Otto Heinrichsbau in the Renaissance



Heidelberg University Gymnasium

style and the mass verrococo Friedrichsbau The University (founded 1386) is the oldest in Germany Of some interest to visitors is the vat housed in the castle cellar 20 ft high and 31 ft long its capacity is 49 000 gallons Pop 8 000

Heifetz, Jascha (b 1901) Russian violinist studied with Auer in St.

Petersburg and at the age of 10 was perfectly equipped artist After touring Europe he conquered America at the age of 18 and was the first musician to gain a reputation in England by means of gramophone records before actually appearing here He has since frequently appeared in London and has toured the British Isles

Heine Heinrich (1797-1856) German poet of Jewish birth studied at Bonn Göttingen and Berlin His first important work *Reisbilder* appeared in 1836 and his greatest *Das Buch der Lieder* was published in the next year He travelled widely in Europe and finally settled in Paris where he became intimate with the Romantics including Victor Hugo De Musset and Chopin He wrote of them in *Die Romantische Schule* (1838) His works were now banned in Germany and in reply to this he wrote *German Philosophy and Literature an essay and Deutschland* (1844) satire In his best work his lyrics hovered between sentimentality and cynicism but he had a keen appreciation of emotion and a perfect style for the expression of it The lyrics have been frequently translated and set to music by Schumann Brahms and Grieg

Heir person who succeeds by descent to an estate of inheritance an Heir apparent is a person who must succeed if he outlives his ancestor e.g. the eldest son of the sovereign an Heir presumptive is one who while living at a given moment may cease to be so by some contingent event such as the birth of a son to his elder brother

Heirloom Personal chattels which go by force of a special custom to the heir along with the inheritance and not for distribution to the executor or administrator of the last owner The owner may dispose of them in his lifetime but cannot bequeath them by will if he devises the land to the heir Heirlooms are now rare a notable example is the Crown jewels

Hejra (or Hegira) (Arab flight) name given to Mohammed's flight from

Mecca to Medina to avoid persecution, in A.D. 622. The Mohammedan era dates from this event, the years being denoted by the initials A.H. (*anno hegiræ*). See MOHAMMEDAN CALENDAR.

Hekla, Mount, see ICELAND, GEYSER.

Helen of Troy, in Greek legend, the most beautiful of women, daughter of Zeus and Leda (*q.v.*). All the powerful princes of Greece were her suitors, and it was decided that she should make a free choice among them. She chose Menelaus, King of Sparta. Later, Paris, son of the King of Troy, came to Sparta and induced her to elope with him to Troy. The Greek princes combined to attack Troy, and thus the Trojan War, a very important event of ancient legend, was caused. After the sack of Troy, her history becomes obscure. She has been celebrated by many writers. Homer, Vergil, Goethe, Marlowe, and scores of others have written of her beauty.

Heland [HÄ'LIUND], literally "the Saviour," is the title given by J. A. Schmeller in his edition of 1830 to an Old Saxon poem of the 9th cent. dealing with the life of Christ. Together with some fragments of a poetical version of the story of Genesis, it comprises the whole extant literature of Old Saxon.

Helianthine, or methyl orange, is the sodium salt of dimethylaminoazobenzene sulphonic acid, and is a dye-stuff of the azo class. It is used in the dyeing of wool and silk, but is most familiar as an indicator, the colour being orange in alkaline solution and red in acid.

Helicon, in classical mythology, a mountain sacred to the Muses (*q.v.*).

Helicopter, see AEROPLANE.

Heligoland (Ger. *Helgoland*), a German island in the North Sea, formerly belonging to Denmark; was taken by the British in 1807 and in 1890 ceded to Germany in exchange for an enormous area in E. Africa. Under the Versailles Treaty (1919) (*q.v.*) its fortifications and military establishments were destroyed. Area

c. 135 acres, pop. just over 3000. Frisians, climate stormy in winter and wet during May and June. On three sides the island, which consists of hard red clay and marl cliffs, rises perpendicularly from the sea nearly 200 ft. There are a biological institute, marine museum, and a monument to those killed in the airship L1. During the summer months it is a popular bathing resort.

Heligoland Bight, Battle of (Aug. 28, 1914), the first important naval action of the World War (*q.v.*), resulting in the loss of 1 British and several German cruisers. The object was to attack the German light ships on patrol in the bight while the tide was low, which would prevent the heavy ships from leaving the Jade harbour. At first successful, the British destroyers were in danger of being surrounded by German cruisers from the Jade, when Beatty with a squadron of battle cruisers swept into the bight and sank some German cruisers, putting the others to flight.

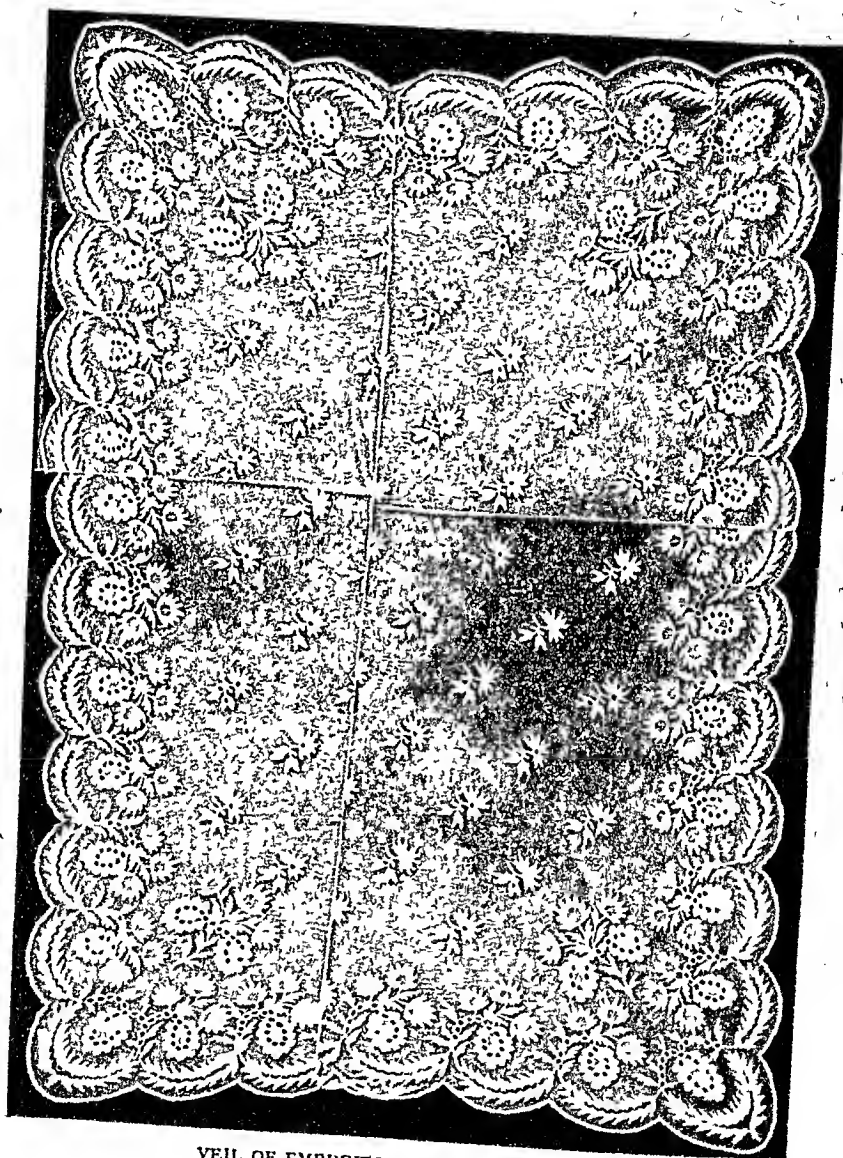
Helogabalus (or *Elagabalus*, c. A.D. 204-222), Roman emperor, succeeded Caracalla in A.D. 218. His real name was Varius Avitus Bassianus, but having as a boy served as priest of the sun-god Elagabalus, he adopted his name upon becoming emperor. The 4 years of his reign, during which his debauchery became a by-word, were ended by his being slain by the prætorians.

Helometer, an instrument originally used for measuring the diameter of the sun, but later for measuring small angular distances between stars. By its means the first accurate measurements of stellar parallax were made, whereby the distance from the earth of some stars could be determined. The system has been displaced by measurements of stellar photographs. See also ASTRONOMY, OBSERVATORY.

Helopolis, ancient Egyptian city and metropolis of the cult of sun worship. To-day only ruined fragments remain in the open fields. Situated at the S. angle of the Nile



KANCHENJUNGA



VEIL OF EMBROIDERED ENGLISH LACE
(First quarter of the 19th century)

delta it was mentioned in the Old Testament under the name of On. Before the rise of Alexandria under the Ptolemies the city is said to have been the leading centre of Egyptian learning.

Heliostat, see SUN

Heliotherapy the use of sunlight in the prevention cure or alleviation of diseases. Sunlight is chiefly effective through the infra red and ultra violet regions of the spectrum. The former heats the skin and dilates the capillaries thereby promoting circulation and the conveying of more scavenging white blood corpuscles to the skin. The heat also dilates the sweat glands. The ultra violet rays are absorbed and are beneficial to the general health even counterbalancing a deficiency in vitamins to some extent. They have been known to cure rickets and are often used as treatment for tuberculosis of bones and joints in which they seem to have a direct effect on the bacteria. Fog and cloud intercept the rays so the best results are obtained at high altitudes. In the Swiss Alps is a

sanatorium where tuberculosis, lupus, rickets and other diseases in children are treated. Ultra violet rays promote pigmentation which has been shown to be beneficial in resisting disease.

Heliotrope (or *Cherry Pice*) a green house flowering shrub of the **BORAGE**



Heliotrope

family with heads of purple or white strongly scented flowers and ovate leaves of rough texture. The plants

require a compost of equal parts of loam leaf mould and sand and additional liquid manure when flower buds are forming. There are numerous varieties of the cultivated species which is a native of Peru.

Heliozoa (or *Sui Animalcules*) a group of Protozoa (*qv*) found mainly in fresh water and related to the Foraminifera. They derive their name from the fancied resemblance to the sun exhibited by their nearly spherical bodies and stiff slender radiating processes or pseudopodia.

Helium a gaseous element belonging to the group known as the rare or inert gases. Helium is with the exception of hydrogen the lightest element. It is widely distributed and occurs in minute quantities in the air in the water of radioactive and other springs (the gases from a French spring contain 10 per cent of helium) and in natural gas. This latter is the principal source of commercial helium some gases containing as much as 18 per cent.

Helium was for decades merely a scientific curiosity until in the latter years of the War it was decided to produce it on a large scale for the inflation of military aircraft for which purpose it is particularly suitable being light and non inflammable.

Apart from its practical uses helium is an element of great theoretical interest. In 1903 it was shown to be a product of radioactive disintegration being discharged in the form of alpha particles (*qv*). The electronic structure of the helium atom points to the conclusion that helium like hydrogen is one of the fundamental bricks out of which all forms of matter are constituted.

The great advantage of helium over hydrogen is the fact that it is non inflammable and incapable of supporting combustion. In addition the rate of diffusion through the material of the gas cells and the conduction of heat through the gas are considerably less.

Other uses for helium include the filling of certain special types of elec-

tric lamps, and of luminous electric signs where it gives a green or yellow colour depending upon the pressure employed as a medium in which to make welds, in low-temperature gas thermometers, and, for purely scientific purposes, as a means of attaining extremely low temperatures.

Helium is also used in deep-sea diving in place of nitrogen. See also AROM. The characteristics of helium are given in the article ELEMENTS.

Hell, the place of punishment for the souls of the wicked after death. The Hebrew sacred writings contain frequent references to Sheol, the place of departed spirits, but only at a late stage in the development of Jewish religious thought was an idea of punishment associated with it. Christian theology gradually developed the idea of eternal suffering, both spiritual and physical, for evildoers, the pains of hell being usually associated with fire, the conception was taken over in a similar form by Islam.

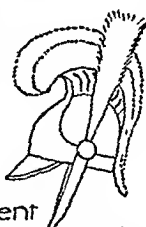
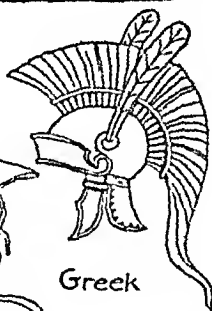
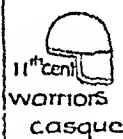
Hellebore, deciduous or evergreen plant of the buttercup family, with large leaves and large flowers with spreading sepals and tubular petals containing honey. A number of species are cultivated for their early flowers, sometimes called Christmas or Lenten rose. The flowers of the cultivated varieties are green, white, rose, crimson, and purple.

Heller, Stephen (1813-1888), Hungarian pianist, and composer for piano. Friend of Liszt and Chopin. His prolific compositions have not retained the popularity they enjoyed during his lifetime.

Hellespont, the strait that separates Asia from Europe, now called the Dardanelles. Helle, a mythical Greek character, was flying through the air on a golden ram, when she fell into the sea at this point, which thereafter bore her name. Xerxes built a bridge of boats across it on his invasion of Greece. See also HERO AND LIANDER.

Helmet, a protective covering for

HELMETS



the head in fighting. The earliest known helmets were used by the ancient Greeks. They were usually open in front but occasionally carried a fixed plate pierced for the eyes and nose and were surmounted by a high crest of horsehair. The Roman helmet was of the same general type but the crest was much smaller. Like the Syrian helmet it was probably derived from the Greek. After the break up of the Roman Empire helmets became simpler in structure and were often merely caps of strong leather sometimes strengthened with iron plates. The conical helmet of the Normans was of this type. It had a nose piece and sometimes guards for the ears and nape of the neck. Thenceforward the designs for helmets followed various lines sometimes close fitting and like a cap sometimes broad brimmed. The bascinet popular in the 14th cent. was a pointed helmet sometimes with a visor and usually attached to the coat of mail by staples and laces.

In the 15th cent. the salade with a visor and adjustable chin piece was favoured and this gave rise to the armet which entirely enclosed the head and had movable pieces over the eyes and mouth. The burgonet is a simplified form. In the 16th cent. lighter and more open helmets such as the cabasset and morion came into favour and in the 18th cent. the forerunner of the modern cavalry and dragoon helmets worn for ceremonial parade was evolved based to some extent on the Greek type. The use of penetrating bullets in modern warfare has rendered armour practically useless but in the World War shrapnel helmets were worn as a protection from flying pieces of shells. These were domed steel caps and were based in design upon the *chapel de fer* of the 15th cent.

Helmholtz, Hermann Ludwig Ferdinand von (1811-1894) German physicist and physiologist. He is immortalised by the Young Helmholtz theory of the nature of light and

did important work in the fields of conservation of energy hydrodynamics electro-dynamics meteorological physics and optics. See also **PSYCHOLOGY (History of)**.

Helmont, Jean Baptista van (1577-1644) Belgian chemist mystic and physician. His work is of interest both in itself and also as marking the transition stage between the older mystical alchemists and the newer scientific attitude to natural phenomena as exemplified some years later by Boyle (q.v.).

Van Helmont was the pioneer in the investigations of gases and is usually credited with the introduction of the word gas. He discovered carbon dioxide and ammonia. By training he was a physician and he followed Paracelsus as an exponent of iatrochemistry. Despite his scientific observations however he believed in the philosopher's stone (q.v.) and he has left us one of the best accounts of alleged transmutation of base metals into gold. In the field of physiology he had for his time a surprisingly accurate knowledge of digestion. He realised the importance of the acids of the gastric juices and of the administration of alkali to remedy excessive acidity of the stomach.

Helots, members of an aboriginal race subject to the Spartans in ancient Greece. They were servants of the State bound to the soil and allocated to individual masters.

Helsingfors, see **HELSINKI**.

Helsinki, formerly *Helsingfors* port and capital of Finland situated on the Gulf of Finland. Its manufactures are sugar spirituous liquors and carpets. Butter timber and corn are exported. The university and cathedral of St Nicholas are the buildings of note. Pop. (1931) 243,500.

Helst, Bartholomæus van der (1613-1670) Dutch painter who studied under Nicolas Elias Pickenoy and was also greatly influenced by Franz Hals. He painted many large portrait groups such as *The Master of the Bugher Guard* and *The Syndics of the B. other*

hood of *St Sebastian*, as well as single figure portraits. His *Peace of Munster* is generally considered his masterpiece. He is represented in the National Gallery and Wallace Collection, and many European galleries.

Helvetic Confessions, the confessions of faith of the Reformed Churches of Switzerland. The first confession was the result of a conference held at Basle in 1536. Accepted by the Swiss, it was superseded by the second confession in 1562. A compound of Calvinist and Zwinglian teaching, this confession became the basis of the Reformed faith in France, Hungary, and Scotland, as well as in Switzerland.

Helveti, a Celtic race, inhabiting the region now comprising Switzerland. They are best known in history from Cæsar's account of them in his *Commentaries*. They invaded Gaul in 58 B.C., and were defeated by Julius Cæsar.

Helvétius, Claude Adrien (1715-1771), French man of letters and philosopher, was the author of *De l'Esprit* (1758), a crude exposition of hedonism which met with much opposition. Helvétius was deprived of his Court positions, and his book publicly burned.

Hem, see **NEEDLEWORK**.

Hemans, Felicia Dorothea (1793-1835), English poetess, published her first volume at the age of 15. She is best known as the authoress of *Casabianca*, *The Beller Land*, *The Homes of England*, and *Belshazzar's Feast*. Many collections of her poems appeared, and her works also include translations, art criticism, and a tragedy, *The Vespers of Palermo* (1823).

Hemichorda, see **BALANOGLOSSUS**.

Hemimorphite is hydrated silicate of zinc. It occurs in tabular crystals, and also massive, and is white, yellowish brown, or sometimes faintly green or blue in colour. It is a valuable zinc ore, occurring in beds or in veins, together with smithsonite (*qv*), and sulphides of zinc, iron, and lead. It is often found as a replacement of limestones, or as the crystalline lining to

cavities. Localities where it is worked are Derbyshire and Cumberland, and other centres of lead and zinc mining. In the United States, where there are important deposits, it is often termed "calamine," though this is a different mineral.

Hemiptera (or *Rhynchota*), one of the orders of Insects (*qv*), of economic importance, since it comprises the aphides or green-fly, the scale insects (*qqv*), frog-hoppers, and others which are destructive to plant-life, as well as blood-suckers, like the bed-bug (see *Bugs*). In all the mouth parts are specially adapted for piercing and sucking vegetable or animal tissues; the development is usually direct, and there are typically two pairs of wings. Upon the variation in the structure of the wings the Hemiptera are usually divided into two suborders, the Heteroptera and the Homoptera. In the former the wings lie flat on the abdomen, and the front pair are horny at the base. To this group belong the shield-bugs, water scorpions, water boatmen (*qqv*), bed-bugs, and others. In the Homoptera the wings slope on the sides of the abdomen without overlapping, and both pairs are membranous. This suborder contains the cicadas, the lantern flies (*qqv*), the green-fly, etc.

Hemlock, a tall, much-branched and graceful umbelliferous plant with perfectly smooth stem which is spotted with red, finely divided smooth leaves, and white flowers. Every part of this plant, especially the fresh leaves and green fruit, contains a volatile, oily alkaloid, called Conine, which is so poisonous that a few drops soon prove fatal to a small animal. It acts on the nervous system, and is a valuable medicine for certain diseases.

Hemp, commercial name for the textile fibres yielded by several unrelated plants, but strictly used only to describe those produced by *Cannabis sativa*, native to S. Russia, Persia, and parts of China. This plant is characterised by a straight undivided stalk, usually from 5 to 8 ft. high, but

sometimes attaining a height of 18 ft. It bears deeply lobed leaves in the axils of which on separate plants are borne the loose clusters of yellow male or green female flowers. The best hemp comes from Italy. It is also cultivated in Russia, the Philippines and elsewhere even a little in Britain. It is mostly used in the manufacture of rope and strong twine and is woven into sail-cloth and fire hose. For making canvas and sacking it has been largely replaced by jute which is cheaper. In the East it is used as a drug or intoxicant under the names of bhang, ganja and charas. The Arabs give the name hashish to a preparation of the leaves. Hemp also has useful medicinal properties.

The plants are grown in close rows, the ripe stems are made into bundles and subjected to retting, bleaching and scutching as in the preparation of flax (qv). They grow best in moist, rich, well-drained loamy soil. From 2 to 2½ bushels of seed are planted over 1 acre, the average yield being 6 to 8 cwt. of fibre and 20-25 bushels of seed. As soon as they have flowered the male plants are pulled, the females being left for the seeds to ripen.

Indian hemp is furnished by *Apocynum cannabinum*, brown Indian hemp by *Hibiscus cannabinus*, Indian bow string hemp by *Calotropis gigantea*, African bow string hemp by *Sans-sevieria guineensis*, Bengal Bombay Madras Brown and Sunn hems by *Crotalaria juncea*, Jubbulpore hemp by *Crotalaria tennifolia*, Manila hemp by *Musa textilis* and Sisal hemp by *Agave Sisalana*.

Hempel, see GAS ANALYSIS

Hemy, Charles Napier (1841-1917), English painter, the son of a musician, born at Newcastle-on-Tyne. He studied painting at the castle and Antwerp and gained great popularity for his marine pictures. He became A.R.A. in 1898 and R.A. in 1910 and was also a member of the Royal Watercolour Society. The Tate Gallery possesses his *Pickards* (1897) and *London River* (1904), typical specimens of his work.

Henbane, a herbaceous plant common in waste places near the sea, belonging to the nightshade family, with large hairy leaves covered with a sticky secretion and numerous funnel-shaped cream-coloured flowers with purple veins and a dark eye. The whole plant has a disagreeable smell and is dangerously narcotic.

Henderson, Arthur (b. 1863), British politician, born in Glasgow. During his employment as a moulder in New



ARTHUR HENDERSON.

castle on Tyne, he identified himself with the trade union movement and in 1903 entered Parliament as Labour member for Barnard Castle. From 1908 to 1910 he was chairman of the Labour Party, a position he filled again in 1914. In 1916 he became Paymaster General and Labour Adviser to the Government, and a year later joined the War Cabinet. In the first Labour Government (1914) he was Home Secretary and in 1919 became Secretary of State for Foreign Affairs. He lost his seat in the General Election

of 1931, and in 1932 was President of the Disarmament Conference at Geneva. He was elected M.P. for Clay Cross in a by-election (1933).

Hendiadys [HENDI'ŌDIS], term for the grammatical figure of using two nouns coupled by a conjunction, in place of a noun and an adjective, e.g. "with venom and with darts" for "with venomous darts."

Hengist and Horsa, two brothers, chieftains who led the Anglo-Saxon invasion of England, landing at Ebbsfleet, Kent, between A.D. 450 and 455. They subsequently ruled the kingdom of Kent. After Horsa's death in battle, Hengist reigned with his son until his death in 488. The story that they were invited by Vortigern, King of Kent, to aid him against the Picts is now largely discredited.

Henley, William Ernest (1849-1903), English poet and journalist, a close friend of R. L. Stevenson. He became Editor of the *Scots Observer* (1889), later the *National Observer*, in which he first published the *Barrack-room Ballads* of Kipling, with whose work his own has much in common. His poems and criticisms were widely read, and he exercised a great influence on contemporary writers. A very high poetic level is maintained in his lyrics, in which he successfully exploited traditional English metres, the old French forms, and free verse.

Henna, a small shrub (*Lawsonia*) with lance-shaped leaves and fragrant white flowers of 4 petals, sometimes called Egyptian privet. The leaves powdered and made into a paste, or preparations thereof, are used as a dye for the nails and hair.

Henrietta Maria (1609-1669), Queen-Consort of Charles I of England and daughter of Henry IV of France. Her husband's failure to carry out his promise, made before marriage, to relieve the English Catholics from the operation of the penal laws, caused an estrangement between them which Buckingham did his best to aggravate. After the latter's assassination, however, the breach was healed. She was

the instigator of the Army Plot of 1641, and encouraged the attempt to arrest the 5 members in 1642. She marched with the King to Oxford at the head of the Royalists in 1643, but in 1644 she fled to France, where she continued to work for her husband's cause until his execution in 1649. She returned to England after the Restoration, subsequently residing at Somerset House. In 1665 she again left for France, where she remained until her death.

Henry (elec.), see ELECTRICITY, ELECTRO-MAGNETIC INDUCTION.

Henry II (c. 973-1024), called the "Saint," Holy Roman Emperor. In 1002 he became emperor in succession to Otto III. Two years later he acquired Lombardy and freed Bohemia from Polish rule. In 1015 he again fought with the Poles, peace being finally achieved in 1017. In 1020, at the request of the Pope, he allied with the Normans to defeat the Greeks in S. Italy. He was canonised in 1140 by Pope Eugenius III.

Henry III (1017-1056), the "Black," Holy Roman Emperor, son of Conrad II, whom he succeeded in 1039. He defeated Bretislaus of Bohemia in 1041, and proceeded to subdue the rebellious Hungarians and to reinstate their king. In 1050 he defeated Godfrey of Lorraine, who with Baldwin V of Flanders had risen against him. He was a noted scholar and a church reformer.

Henry IV (1050-1106), Holy Roman Emperor, elected German king in 1053 and crowned Emperor by Pope Clement in 1084. By his father's death, in 1056, he inherited the kingdoms of Germany, Italy, and Burgundy. His chief wars were with Saxony, Thuringia, and Swabia, whose duke, Rudolph, was chosen German king while Henry was in Italy on a visit to Pope Gregory VII (*q.v.*) at Canossa. This visit, which he undertook in order, by pretending to abase himself, to conciliate the Pope who had excommunicated him, did not serve its purpose, and in 1081 Henry

attacked Italy took Rome deposed Gregory and set up Guibert Arch bishop of Ravenna as pope Clement III. He was forced to return to Germany where a fresh rebellion had broken out and then to march back to Italy where Clement had been deposed in his absence (1087). His son Henry who was chosen German king rebelled against his father and captured him in 1105. Henry IV escaped but died before he could raise an army against his rebel son.

Henry V (1081-1125) Holy Roman Emperor son of Henry IV. He became King of Germany in 1088 and Emperor in 1106. His reign is chiefly notable for his dispute with the papacy over the question of lay investiture which resulted in the emperor's excommunication. An agreement was reached at the Concordat of Worms (1122) when the ban was lifted. His wife was Matilda Stephen's competitor for the crown of England.

Henry VI (1155-1197) Holy Roman Emperor son of Frederick I was elected king of Germany in 1169 and crowned emperor in 1191. He conquered Sicily (1194) claimed Tripoli and Tunis and stipulated that the Balkan peninsula be ceded by the Eastern emperor in return for assistance. He failed however to induce the Pope to crown his son and recognise his succession.

Henry VII (c. 1155-1313) Holy Roman Emperor son of Henry III Count of Luxemburg elected German King in 1308 and crowned emperor in 1312. He died while attempting to reunite Italy with Germany and rebuild the former empire.

Henry of Hainault (c. 1172-1216) Emperor of Constantinople. He took part in the 4th Crusade and was prominent in the Siege of Constantinople (1204). He succeeded his brother Baldwin I in 1205 and was a wise and conscientious ruler.

Henry I (1064-1135) King of England the youngest son of William the Conqueror. After his succession in

1100 he was engaged in foiling the attempts of his elder brother Robert to wrest the crown from him finally defeating him at Tinchebrai (1105) and taking possession of the whole of Normandy. Henry ruled wisely initiated many reforms and founded the exchequer. His only son William having been drowned in the *White Ship* (1120) he made the barons swear to support the succession of his daughter Matilda to the throne which ultimately went to Stephen.

Henry II (1133-1189) King of England grandson of Henry I and son of Matilda and Geoffrey of Anjou. He succeeded Stephen in 1154. Henry managed to wrest from the barons the power obtained by them in Stephen's time. He attempted to abolish the abuses of ecclesiastical power by drawing up the Constitutions of Clarendon (1164). He appointed Becket who had hitherto supported his schemes as archbishop. Becket however once installed as primate opposed Henry's plans of Church reform. A truce was effected in 1170. Becket's murder in the same year far from furthering the king's cause forced him to surrender what ground he had gained. In 1171 he conquered Ireland and a year later quelled the rebellious barons in England. In the later years of his life his sons rebelled against him.

Henry III (1207-1272) King of England son of King John and grandson of Henry II. He succeeded to the throne at the age of 9 at a time when many of the English barons were paying allegiance to the French pretender Louis. During the successive regencies of Marshal Earl of Pembroke Hubert de Burgh and Stephen Langton French power was broken and Louis left England. In 1232 Henry dismissed de Burgh and began his own independent policy indulging in an unwise choice of unscrupulous advisers and favourites. This resulted in the Provisions of Oxford (1258) by which his power passed to Simon de Montfort and his party of the barons. The

decision of the French King, when asked to arbitrate on the Provisions in favour of Henry, caused war between de Montfort and the King, who was defeated at Lewes in 1264. The Parliament of 1265 was summoned and the King's assent to the new constitution obtained. At Evesham, in the same year, de Montfort was killed by the King's son, Edward, and Henry's disastrous reign virtually came to an end, his son restoring order in the kingdom.

Henry IV (1367-1413), King of England, son of John of Gaunt, the first of the kings of the House of Lancaster. He compelled Richard II to abdicate, and was crowned King in 1399, Richard dying in prison in the same year. In 1400 he quelled a rising by some previously dispossessed partisans of Richard's, marched against the Scots, and returned to subdue the Welsh risings led by Glendower. Percy Hotspur, who had defeated the Scots in 1402, turned against the King, and formed an alliance with Glendower, but was defeated and slain at Shrewsbury in 1403. Two years later Archbishop Scrope's rebellion resulted in his execution, and in the same year Henry captured the heir to the Scottish throne. In his last years he suffered bad health, but resisted an attempt to force him to abdicate in favour of his son.

Henry V (1387-1422), King of England, son of Henry IV. In his youth he fought against Glendower (*qv*) in Wales and also at Shrewsbury. As a prince he is said to have been wild and reckless. On ascending the throne in 1413, he had the body of Richard II buried in Westminster Abbey, and restored their estates to many of those who had been dispossessed by his father. In 1415 he invaded France and won his famous victory at Agincourt. In 1417 the two-year siege of Rouen began. On the fall of Rouen, Henry advanced to Paris where, after the assassination of John, Duke of Burgundy, and the conclusion of an alliance with Philip, the new duke,

he was, in 1420, made regent of France and heir of Charles VI by the Treaty of Troyes. In the same year he married Catherine of France. He died 2 years later at Bois de Vincennes.

Henry VI (1421-1471), King of England, son of Henry V. He succeeded to the throne when less than a year old and soon afterwards became King of France on the death of Charles VI. He was crowned at Westminster in 1429 and in Paris in 1431. While Henry was still a youth the possessions that had been won in France by his father were recovered by the French, and by 1453 Calais was the sole English possession in France. In the same year the King lost his reason, and Richard of York became protector, only to be deposed a year later on the King's recovery. This brought to a head the hostility between Yorkists and Lancastrians, and the Wars of the Roses followed.

After the battle of St. Albans (1455) a truce was effected until 1459. Henry was defeated and captured at Northampton by Warwick in 1460 and made to acknowledge York as heir. In 1461 Edward of York was proclaimed King, and Henry fled to Scotland. In 1465 he was captured in the N. of England and imprisoned in the Tower for 5 years. In 1470 Warwick placed him on the throne again for 6 months. At the end of this time Edward returned, defeated and killed Warwick at Barnet, and won the battle of Tewkesbury, and on the night of his entry into London, Henry was murdered. Henry was a notable scholar, and was responsible for the foundation of Eton College and King's College, Cambridge.

Henry VII (1457-1509), first of the Tudor Kings of England, son of Edmund Tudor and Margaret Beaufort. On the murder of Henry VI he became head of the Lancastrian house. After being a refugee in Brittany he invaded England in 1485 and defeated Richard III at the battle of Bosworth. He was crowned in the same year, and by his marriage to Edward IV's daughter, Elizabeth, the

Yorkists and Lancastrians were held to be united. A believer in the policy of foreign marriages for political ends Henry married his son Arthur to Catherine of Aragon and when Arthur died arranged that Catherine should marry his second son Henry. Then in order to further the future union between Scotland and England he married his daughter Margaret to James IV of Scotland in 1503. After the treaty of Etaples (149) he strove successfully for peace with the principal Powers on the Continent with an eye to the commercial advantages to be gained by such means. He established national order and prosperity.

Henry VIII (1491-1547) King of England second son of Henry VII. On his accession in 1493 he married



Henry VIII

his brother's widow Catherine of Aragon. After winning the Battle of Spurs (1513) he made peace with France and aided by Wolsey proceeded to act as arbiter between Francis I of that country and Charles V of Spain meeting the former king at the Field of the Cloth of Gold in 150. Eventually he secretly sided with Charles. About the year 1515 his desire for a male heir and his infatuation for Anne Boleyn moved him to begin negotiations for a divorce from Catherine. The Pope however was in the power of Charles V who was opposed to the divorce. The commission called to decide the question proved abortive and Wolsey who had prophesied acquiescence on the part of Rome was summarily dismissed from favour and Cranmer took his place. The breach with the Papacy was begun and Henry directed all his efforts to making it complete.

He reduced clerical privilege and property separated from Catherine and married Anne Bol yn secretly having her publicly crowned in 1533 after Cranmer had declared his marriage with Catherine invalid. Henry was declared head of the English Church the last tie with Rome was cut and the monasteries were dissolved.

Anne Boleyn who failed to produce the desired male heir was beheaded in 1536 Henry's next wife being Jane Seymour who gave birth to a son but died soon afterwards. In 1540 Henry married Anne of Cleves his fourth wife. He divorced her in the same year and married Catherine Howard whom he executed in 1542. In the following year he married Catherine Parr who survived him. The last years of his reign were marked by invasions of Scotland and France and many ruthless executions.

Henry I (1008-1060) King of France. He succeeded his father in 1031 and defeated his brother Robert in 1034. In 1047 began a long period of warfare with William of Normandy. His son Philip was crowned a year before Henry's death.

Henry II (1154-1189) King of France married Catherine de Medici (1533) and succeeded Francis I in 1547. The help accorded to Scotland by France resulted in war with England. Boulogne was recaptured for France (1550) and Calais which had been in the hands of the English for over 200 years was won back in 1558. Henry who was anti-Protestant and a believer in absolute monarchy was accidentally killed at a joust.

Henry III (1551-1589) King of France 3rd son of Henry II last of the Valois. A confirmed enemy of the Protestants he was one of the main instigators of the St. Bartholomew massacre in 157. He was elected King of Poland in 1573 and succeeded Charles IX as King of France (1575). With his ally Henry of Navarre (afterwards Henry IV) he was besieging Paris when he

was murdered by the monk Clément (1589)

Henry IV (1553-1610), first Bourbon (*qv*), King of France As the Protestant Henry of Navarre he succeeded Henry III in 1589 For 10 years after his accession the Catholic League, aided by Spain, opposed him His conversion to Catholicism (1593) hastened the truce eventually effected by the capture of Amiens (1598) and Philip of Spain's agreement to the peace of Vervins He initiated many financial and industrial reforms, and fostered commercial relations abroad He was assassinated by a fanatical Jesuit One of the most popular kings who ever sat on the French throne

Henry I (c 876-936), "the Fowler," German King He became Duke of Saxony (912) on the death of his father, Otto I, and in 918, by election, succeeded Conrad I as King of Germany In 921 he acquired Lorraine, and later subdued the E Slavs and defeated the Hungarians He did much to extend and strengthen the German State

Henry II (1333-1379), King of Castile, the illegitimate son of King Alfonso XI He drove the legitimate heir, Pedro the Cruel, from the throne, but was checked by the Black Prince at Najara (1367) In 1369 he captured Pedro, put him to death, and succeeded him

Henry, Prince of Battenberg (1858-1896), son of Prince Alexander of Hesse, married Princess Beatrice, youngest daughter of Queen Victoria, in 1885, and had 3 sons and 1 daughter The latter became Queen Victoria (Ena) of Spain, two of his sons Marquesses of Carisbrooke and of Milford Haven (*qqv*) He died of fever caught in the Ashanti Expedition of 1895

Henry the Lion (1129-1195), Duke of Saxony and Bavaria, married Matilda, daughter of Henry II of England He developed the commercial and municipal life of Saxony and N Germany, expanding the Baltic seaports and founding the city of Munich. He

quarrelled with, and was eventually banned by the Emperor Frederick II was twice banished, but in 1193 made peace with Henry VI

Henry the Navigator (1394-1460) the son of John I of Portugal and Philippa, daughter of John of Gaunt He distinguished himself at the siege of Ceuta (1415) and later organised the famous voyages of discovery to the African coast, the Canary Islands, Madeira, and the Azores He founded an observatory at Sagres, near Cape St Vincent

Henry, Cardinal of York (Henry Stuart, 1725-1807), son of James Stuart, the "Old Pretender," took part in raising French troops to aid the Jacobite rising of 1745 He was made cardinal in 1747, Archbishop of Corinth (1759), and Vice-Chancellor of the Holy See (1767) On the death of his brother Charles (1788), Henry claimed to be the rightful King of England and styled himself Henry IX Made penniless by the invasion of Italy by the French (1799), he accepted a pension from George III.

Henry, Sir Edward (1850-1931), British criminologist He joined the Indian Civil Service, and in 1891 became Inspector-General of Police Profiting by his experience in India, he drew up a simple classification whereby finger-prints could be indexed and quickly traced In 1901 he was made Assistant-Commissioner of Police in London, and in 1903 Commissioner of Police and head of the CID, the efficiency of which he much increased He founded the Peel Training School After the 1918 police strike he resigned and was made a baronet

Henry, O, nom-de-plume of William Sydney Porter (1862-1910), American writer of short stories He lived for some time in Texas, where he became a journalist He was imprisoned for 3 years on a charge of embezzling funds of the Austin Bank; on his release he removed to New York, where he produced his famous stories These include *Cabbages and Kings* (1904), *The Four Million* (1906), and *The*

Voice of the City (1904) they are notable for their construction vivid imagination and humour

Henry of Ghent (c. 1150-1193) medieval philosopher was a lecturer in Ghent and Paris. He was a Platonist opposed the Aristotelian doctrine then current and wrote among other works *Summa theologiae* and *Quodlibeta theologiae*

Henry of Huntingdon (1084?-1155?) English chronicler visited Rome in 1139. His work is entitled *Historia Anglorum* and deals with the history of England from the landing of Julius Caesar to his own times

Henryson, Robert (1400?-1500?) Scots poet follower of Chaucer best known for his charming and vivacious *Moral Fabliaux of Esop* and *Testament of Cresseid*. His dialogue *Robyn and Makyn* is the first English pastoral poem

Henschel, Sir George (b. 1800) composer conductor and singer born at Breslau. Made an impression at his vocal recitals with his fine baritone voice and cultured style. Conducted Boston Symphony Orchestra 1881-4 founded the London Symphony Orchestra knighted 1914. Has composed operatic orchestral and religious works and in spite of his advanced age demonstrated by his gramophone records the quality of his voice and soundness of his method

Henslowe, Philip (d. 1616) English theatrical manager. In 1584 he bought the site of the Rose Theatre and had a share in the management of the Swan the Fortune the Hope and the Swanier bawling garden on Bankside. His *Diary* which records the payments etc. involved in his productions is the most valuable source of information concerning the history of the Elizabethan theatre.

Henson, Leslie (b. 1891) English comedian and producer first appeared in Tatters concert party at Bath 1910 while in the Army organised concert parties in France 1918 author of *My Laugh Story* (1906)

Hentschel, Carl (1864-1930) in

vention of the Hentschel colour type process. He was born in Poland and came to England at an early age. He was a member of the Corporation of the City of London 1901-11 and founded the Maygoers Club. He owned and edited *The Play-off* and published *Paper Process Engineering* (1900) and other works

Henry George Alfred (1830-1900) English author of adventure stories for boys was a war correspondent in the Austro-Italian Franco-Prussian, Russian and Serbian Wars. His first book *Out in the Pampas* appeared in 1868. Others are *Berlin the British with Clive in India*, *The Young Frank Trenchard* and *With a Ticket to the Sudan*

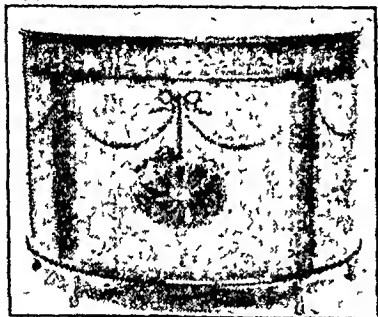
Hepaticum, Latin name for the liverworts primitive land plants whose vegetative body is not differentiated into stem root and leaf but is a flat plate of tissue. A number of liverworts are to be found lining the clay banks of streams close down to the water's edge

Hephaestus (Ἥφαιστος) the Greek name for the Roman Vulcan (god of fire and forger of thunderbolts)

Hepplewhite, George (d. 1786) date of birth not known) one of the four great English 18th-century cabinet makers (see *FURNITURE*). He was a contemporary of Chippendale, Robert Adam and Sheraton though he predeceased them by 36 and 20 years respectively. He invented or popularised the shield back chair. The legs either tapered (normally ending in a spade foot) or were reeded. Under him the sideboard developed from the side-table. Unlike Chippendale who relied for effect on carving allied to form, Hepplewhite introduced a moderate amount of inlay which was to be further developed by Sheraton. Neither Hepplewhite nor Sheraton, however, cared for that over-elaboration of inlay which as marquetry (q.v.) appealed to the Dutch and the French. Like Robert Adam, Hepplewhite produced some painted furniture but his favourite medium was Spanish

mahogany. Some of his smaller pieces, such as knife-boxes, tea-caddies, and fire-screens, are very attractive. His four-poster beds and settees are among the most interesting of the larger pieces. In some of his settees and stuffed-back chairs he shows strong French influence.

Like the other great cabinet-makers, he produced a book, *The Cabinet Maker and Upholsterer's Guide*, published 2 years after his death. Little of the furniture called "Hepplewhite" can be with certainty attributed to him, and the name indicates a style rather than a provenance. Hepplewhite's furniture is free from



Hepplewhite Satinwood Commode. Top and Frieze Inlaid with Fan Design and Honeysuckle Motif in Coloured Woods

the heaviness that mars some of Chippendale's work, and he achieves gracefulness without sacrificing strength and durability.

Heptarchy, word used to denote a period in English history when England was divided up into several kingdoms. It is so called from the belief that they were 7 in number, from 450 until the union under Egbert in 828, but the number actually varied. The most important were W. Mercia, lying in the Midlands, Wessex, comprising Hampshire and the S.W., and Northumbria, the land N. of the Humber. See also ENGLISH HISTORY.

Hera, the Greek name for the Roman Juno (qv), the wife of Jupiter (or Zeus), the Queen of the gods.

Heraclius (c. 575-612), Roman emperor of the East; deposed Phocas at Constantinople in 610 and was proclaimed emperor. Attacked by the Persians and Avars, he made a treaty with the latter, and was able to pit his whole strength against Persia. After a long and brilliant campaign and a Persian rebellion which resulted in the King's son taking his place on the throne and proposing peace, fighting at last ceased in 628. In the following year, however, the Saracens invaded Syria, gaining a succession of victories which, aided by Heraclius's defeatist attitude, resulted in their further occupation of Palestine, Mesopotamia, and Egypt.

Herald, an officer of arms whose duties were originally of a military and diplomatic character, but in time were resolved into granting and regulating armorial bearings, investigating genealogies, superintending public ceremonies, etc. The Heralds of England were incorporated by Richard III, and Queen Mary in 1555 gave them their present official residence, the Herald's College or College of Arms, London. The College consists of 3 **KINGS-OF-ARMS**—*Quarter, Clarenceux, and Norroy*, 6 **HERALDS** who have precedence by seniority of appointment—*Chesler, Lancaster, Richmond, Windsor, York, and Somerset*, and 4 **PURSUIVANTS**—*Rouge Dragon, Portcullis, Rouge Croix, and Bluemantle*. There is also another King, styled "Bath," who is specially attached to the Order of the Bath. The chief Herald of Scotland is "Lyon King-of-Arms", and the establishment over which he presides is the "Lyon Office". "Ulster King-of-Arms" is the chief Herald of Ireland.

Heraldry, the science of armorial bearings. The practice of wearing devices and distinguishing marks is of very ancient origin, but nothing that can properly be called armorial bearings existed much before the middle of the 12th cent. Heraldry developed because it was of practical use to distinguish individuals, especially in

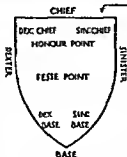
HERALDRY

POINTS or PARTS
of SHIELD (FIG. 1)

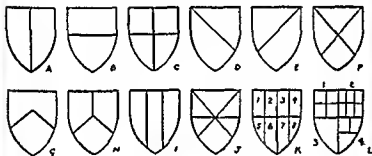
- (1) INFEETED
 (2) ENPOINTED
 (3) RAGULE
 (4) NERULE
 (5) IN BULE
 (6) DOVETAILED

DIVIDING LINES
(FIG. 2)

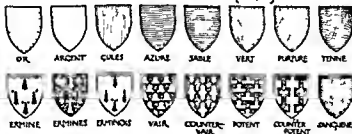
- (A) INDENTED
 (B) DANCETTE
 (C) WAVY OR UNDE
 (D) WAVY OR UNDE
 (E) ENGRAILED



DIVISIONS (FIG. 3)



TINCTURES. (FIG. 4)



war and at the tournament, when armour was worn. Since it was so directly connected with military equipment, mediæval heraldry has also been entitled *Armory*. Men wore their devices embroidered upon the garment that partially covered their armour, and so they called them *Coats-of-Arms*, they bore these same devices on their shields, and called them *Shields-of-Arms*, they displayed them on their armorial banners and pennants.

Originally every knight assumed what arms he pleased, often devices and mottoes were chosen on account of their allusive associations, e.g. a broken spear for Brakespear, rabbits' heads for Rabett (Fig 7), etc. These are called *Canting Arms*, or *Armes Parlantes*. Since there was no central authority to control the adoption of devices, confusion soon arose from different knights adopting the same bearings, and the confusion was increased when sovereigns and feudal chiefs began to allow their arms, or part of them, to be borne as a mark of honour by their favourites. The task of control was entrusted to *Heralds*, and their position became one of great honour and importance. The principles of heraldry became settled in the 13th and 14th cents. In England, and even more so in Scotland, the wearing of armorial bearings has always been strictly controlled, the result is that English and Scottish heraldry is by far the purest at the present day, and did not suffer as much as continental heraldry from the exuberant bad taste of the 18th- and 19th-cent heralds.

Armorial bearings may be classified as follows: (1) *Arms of Dominion*, the arms borne by sovereigns, being the arms of their territories. (2) *Arms of Pretension*, which sovereigns bear who, though not in possession, claim a right to the territories in question, e.g. England bore the arms of France from the time of Edward III till 1801. (3) *Arms of Community*, borne by corporations, e.g. cities, universities, bishops' sees, etc. (4) *Arms of Office*, borne, with the personal arms, to

denote official rank. (5) *Personal Arms*, borne by right of grant or inheritance.

A coat-of-arms is composed of *charges* depicted on an *escutcheon* representing the old knightly shield, usually triangular in form, with the point downward, the chief exception in England being that the arms of a lady are lozenge-shaped, and the shield of a knight-banneret was square. To facilitate *blazoning*, i.e. description, the surface of the shield is divided into 10 points (Fig 1) the chief, the base, the dexter side, the sinister side, the dexter chief, the sinister chief, the sinister base, the honour point, the fesse point. It will be noticed that the dexter and sinister sides of the shield, meaning respectively right and left, are so called from their position in relation, not to the eye of the spectator, but to the supposed bearer of the shield. The shield has 8 divisions, and in blazoning these, the term *per*, alone or preceded by the word *parted* or *party*, is used. The divisions (Fig 3) are: (A) *Per pale*, parted per pale, or party per pale. (B) *Per fesse*. (C) *Per Cross*, or, more commonly, *quarterly*. (D) *Per bend*. (E) *Per bend sinister*. (F) *Per saltire*. (G) *Per chevron*. (H) *Per pale*. *Tierced in pale*. (I) is a form seldom met with in English heraldry, the pale being blazoned as a charge (see below). Strictly, the further form *gyronny* (J) should be added, neither the term *per*, nor *parted per*, is ever employed with this form. A shield may be subdivided into any number of *quarterings* by lines drawn per pale and per fesse, cutting each other as in (K), which is *quarterly of eight*. This is called simple quartering. Again, a quartered shield may have one or more of its primary quarters quartered (L), which is compound quartering. The four primary quarters 1, 2, 3, 4 are called *grand quarters*, 1 and 4, as shown, are *quarterly of four*, 2 is *quarterly of six*. Dividing and border lines may assume the forms shown in Fig 2. Unless such a form is mentioned, the line is assumed to be straight.

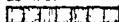
Coats-of arms are distinguished from one another not only by their divisions and charges but also by colours technically termed *tinctures* (Fig 4) These may be (1) *Metals*—gold termed *or* and silver termed *argent* they are coloured yellow and white or represented respectively by dots or a plain field () *Colours*—red blue black, green purple termed *gules* *azure* *sable* *vert* and *purpure* The hatchings representing these tinctures are shown in the figure Occasionally two other colours are found *tawny* or orange colour and *murray* or *sanguine* a dark crimson (3) *Furs* originally two in number *ermine* and *vair* The former is shown by black spots on white the latter consists of alternate divisions of blue and white To these have been added *ermine*—white spots on black *ermineous*—black spots on gold *pean*—gold spots on black counter *vair* potent and counter potent are various arrangements of blue and white Should the field of any charge be divided into a single row of small squares it is called *compony* if into two such rows it is *counter-compony* (Fig 5) if into three or more rows it is *chequy* or *checky* The law of tinctures is that every charge of a metal must rest on a field of a colour or fur and *vice versa*—a metal must not be on metal nor colour on colour The rule is relaxed when one bearing is charged upon another and it does not apply to what is termed the accessories of a charge e.g. a lion argent having a tongue gules may be charged on a field azure The best known violation of the rule is the silver shield of the Crusader Kings of Jerusalem upon which five golden crosses are charged *Counter-charged* is dividing the field of a shield in such a manner that it is e.g. partly of a metal partly of a colour and then arranging the charges in such a manner that they shall be reciprocally of the same colour and metal (see Fig 5) Everything contained in the field of an escutcheon is called a *charge* and charges are of 3 classes—*ordinaries* *subordinaries* and

common charges The first two classes will be found illustrated in Fig 5 and some of the more usual common charges in Fig 6

Ordinaries (1) The chief of which the diminutive is the fillet (.) The pale which has 2 diminutives the pallet and the eudorse (3) The bend its diminutives are the bendlet or garter the cotise and the riband (4) The bend sinister is a diagonal band from sinister chief to dexter base its diminutive the baton is sometimes used as a mark of illegitimacy and in the more popular fiction is often wrongly termed bar sinister (5) The fesse (6) The bar similar to the fesse but narrower and never placed in the middle of the shield Its diminutive is the barrulet bars in pairs are called bars gemelles (7) The chevron with a diminutive the chevronel (8) The cross of which some 400 varieties exist (9) The saltire which is the ordinary St Andrew's Cross (10) The pile a wedge with the point downwards

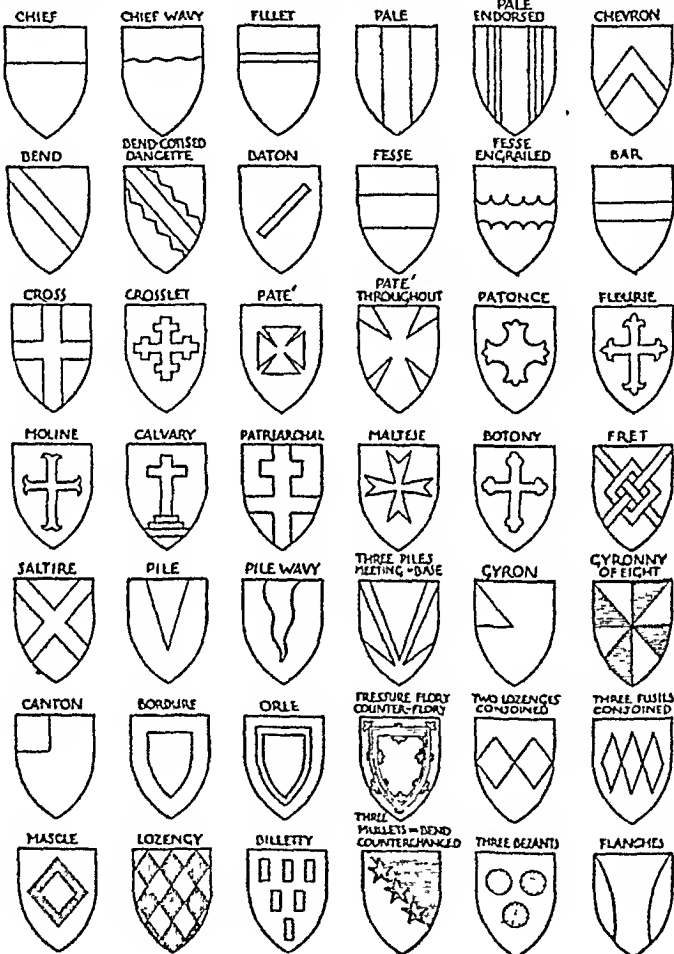
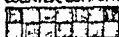
The *subordinaries* are as follows The gyron The fret an interlaced design when it is repeated over the field the latter is said to be fretty The canton is a small shield charged upon the main shield The bordure is a band encircling the shield differing from the orle in that the latter is narrower and does not touch the extremity of the shield The tressure generally borne double and flory counter flory is a diminutive of the orle The lozenge is a square figure set diagonally when perforated it is called a mascle Long and narrower than the lozenge is the fust The billet is a small rectangle about twice as high as it is wide a shield sprinkled with billets is termed *billetty* Roundels are circular charges distinguished according to their tinctures a bezant is of or a plate of argent a torteau of gules a porome of vert a pellet of sable Flanches are the dexter and sinister sides of the shield cut off by a curved line They are always found in pairs

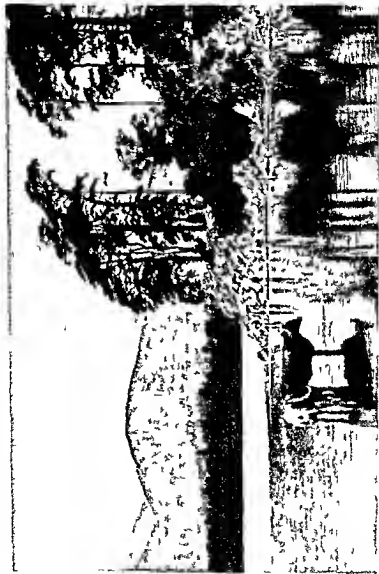
COMPANY



HERALDRY

COUNTER COMPANY





TYPICAL ENGLISH LAKE DISTRICT CEMETERY



TIBETAN LAMA WITH PRAYER WHEEL

HERALDRY



LION RAMPANT



RAMPANT GUARDANT



RAMPANT REGARDANT



SALIENT



PASSANT



PASSANT GUARDANT



PASSANT REGARDANT



STAG AT GAZE

LIONS
COMBATTANT

STAG LODGED



PELICAN IN HER PIETY



PASCHAL LAMB



EAGLE DISPLAYED



FISH



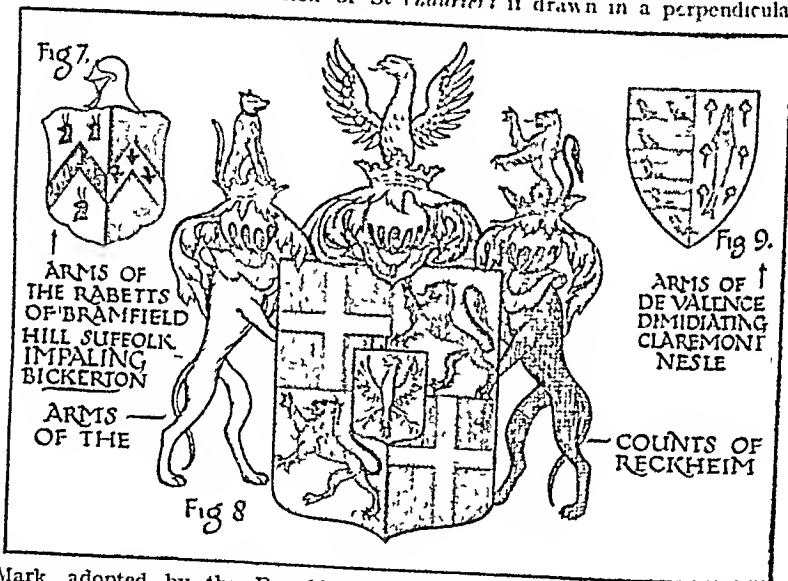
DOLPHIN



MARTLET

The third class of figures, the *common charges*, consist of an infinite variety of more or less conventional representations of familiar objects (see Fig 6), of which only a few can be mentioned here. The lion has always held the most important place. The Kings of England, Scotland, Norway, Denmark, the Counts of Flanders and Holland, and many others, chose the king of beasts. Sometimes lions' tails, paws, or legs (*gamb*) occur as charges. The celebrated lion of St

are *erased*. The eagle is the favourite bird. The martlet, originally a martin, which has been deprived by heralds of its legs and beak, the phoenix, the swan, the parrot or *popinjay*, occur frequently. A peacock borne *affronté* with his tail expanded is said to be in *his pride*. The pelican is often depicted in her nest, pecking her breast to feed her young and is then called *in her piety*. Fishes and reptiles are *naïant* if drawn in a horizontal, and *laurient* if drawn in a perpendicular,



Mark, adopted by the Republic of Venice, is winged, and the lion of Bohemia has two tails, blazoned *lion à queue fourchée*. Bears, boars, bulls, and stags are favourite heraldic beasts. A stag walking is said to be *trippant*, when lying down he is *lodged*, when running he is *courant*, and *at gaze* if he stands with his head turned towards the onlooker. When the head is borne full-faced, and without any neck, it is *caboshed*. Heads or limbs of animals cut off in a straight line are *couped*, when cut off with a jagged edge they

line. Of plants there are *fleur-de-lys*, roses, trefoils, quaterfoils, cinquefoils, garbs, *i.e.* sheaves of corn, trees, often *fructed*, *i.e.* bearing fruit, and a host of others. The heavenly bodies, weapons of war, pilgrims' staffs, all occur. A charge depicted in its natural colours is *proper*. Finally, the arms of the various members of a family are distinguished by charges called *differences*, or marks of cadency, which are superimposed on the other charges (see CADENCY).

Besides the devices shown on the

shield the following are borne external to it the helmet placed above the shield which in English heraldry came to mark the rank of the wearer. The mantling is an embellishment hanging from the helmet and forming a background to the whole composition (see Fig 8). From the centre of the helmet often within a wreath of two pieces of silk twisted or a crown according to rank issues the crest which may be any common charge. The scroll placed either above the crest or below the shield contains the motto of the bearer of the arms. Supporters are figures or animals standing on each side of the escutcheon and seeming to defend or support it.

Marshalling is the combining of different coats of arms in one escutcheon for the purpose of indicating family alliances or office. In early heraldry it was the practice to display only one coat though the arms of husband and wife were often shown *accollé* i.e. placed side by side or the principal shield might be shown surrounded by smaller ones containing the arms of maternal ancestors. Later two coats would be incorporated in one shield parted per pale one half of each coat being shown. This was called *dimidiation*. The coat shown in Fig 9 would be blazoned thus: Barry of ten argent and azure an orle of eleven martlets gules for *de lale* i.e. *dimidiation* gules *armée* of trefonds two barbels addorsed or for *Claremont Nois*. The final development occurred when the whole of each coat was exhibited in one shield. The commonest form of this occurs where the arms of husband and wife are conjoined those of the husband being shown on the dexter side. Thus the coat of the Rabetts of Bramfield Hall Suffolk was as follows (Fig 7): argent a chevron sable charged with five gouttes d'or between three conies heads coupé of the second impaling sable on a chevron argent three pheons of the field for Bickerton. By this method any number of complete coats might be shown on one shield quarter

ing being adopted where there are more than two. Fig 8 shows the coat of the Counts of Reckheim Quarterly 1 and 4 gules a cross or 2 and 3 or a lion rampant gules en surmont on an escutcheon azure an eagle displayed argent (for d'Este a famous Italian family to whom the Reckheims were allied by marriage). In England only the more important coats are marshalled but on the Continent one may sometimes find as many as 20 or 30 coats marshalled in one escutcheon.

Herat, city in W. Afghanistan on the Hari Rud 2500 ft above sea level. It was at one time the capital of a great empire. Outside the city are vast stretches of fertile and well irrigated land. There is also a trade route from Bokhara via Merv to Herat. Pop. c. 30,000.

Herbarium (or *Herbarium Siccum*) a collection of plants dried, named and kept for reference. The entire plant should be preserved or those parts containing generic and specific characteristics. The roots of small plants should be included also the flowers and fruit the male and female flowers of unisexual plants and bulbs or tubers. The paper mount should be a good stiff paper and 17 x 10 in. in size. The plants are placed between drying papers as far as possible in their natural form and pressed under a weight for some days. The dried specimens are secured to fresh paper by glue or gummed paper, the label attached and the sheets stored in a dry press in which camphor is kept to prevent attacks of insects. An excellent Herbarium is kept in the Royal Botanic Gardens, Kew.

Herbart, Johann Friedrich (1776-1841) German philosopher and educationalist born at Oldenburg. He studied under Fichte at Jena and later filled the Königsberg chair after him. At Königsberg he initiated a school of pedagogy which attracted a great number of teachers. English translations of his educational works include *The Science of Education*.

(1892), *Letters and Lectures on Pedagogy* (1899), and *Application of Psychology to Education* (1898). These works are now rather of historical than scientific importance (see **ÆSTHETICS**)

Herbert, name of a family prominent in English history since Norman times. Sir William Herbert was created Earl of Pembroke in 1468. After the death of the 2nd Earl the title lapsed, but in 1551 was revived for William Herbert, who in 1543 had married a sister of Catherine Parr. Later branches of the family included, among others, the Earls of Montgomery, Powis, and Carnarvon.

Herbert, Alan Patrick (b. 1890), English humorist. His works include *The Bomber Gipsy*, *The Secret Battle*, *The House-by-the-River*, and *The Water Gipsies* (novels), *The Wherefore and the Why*, *Misleading Cases*, *The Trials of Topsy*, and *Ballads for Broadbrows*, and the libretti for *The Blue Peter*, *Tantivy Towers*, *Helen I* and *Derby Day* (comic operas).

Herbert of Cherbury, Edward Herbert, Baron (1583-1633), English historian, diplomatist, and philosopher. From 1610 to 1614 he served as a volunteer in the Netherlands with the Prince of Orange, and from 1617 to 1621 he was British Ambassador in Paris. His best-known works are *De Veritate* (1624) and *De Religione Gentilium* (1633).

Herbert, George (1593-1633), English poet and divine, is best known for *The Temple Sacred Poems and Private Ejaculations*. These were greatly popular, and "the gentle Herbert, the sweet singer of The Temple," was a favourite poet of Charles I. He belongs to the "metaphysical" school (*q.v.*) of poetry, in which he has embodied some of the purest poetical thought which has been expressed in English.

Herbs. Many plants have had ascribed to them since the earliest days miraculous medicinal properties. A certain number of these are of proved worth, though rarely as valu-

able as was thought by the ancients, who based their statements at least as often on fancied resemblances of parts of plants to the human body as on experience and trial. Hippocrates (*q.v.*) was first and foremost a herbalist; and the first serious studies both of plant life and the diseases of man arose from the work of those who gathered or collected supposedly remedial plants or "herbs." Culpeper, author of a famous *Herbal* first published in the 16th cent., ascribed the value of the plants to the sun, moon, or ruling planet. Modern herbalists have proved the medicinal value of many herbs, in which are complex chemical substances not obtainable naturally in mineral form, and often extremely difficult to build up artificially. Arnica, Germander, and Spearmint are stimulants, Periwinkle and Chicory, tonics, Potentilla, Rupturewort, Evening Primrose, Loosestrife, Meadowsweet, Bistort, Sage, astringents, Garlic, a diaphoretic, Burdock, St John's Wort, Pimpernel, Plantago, Dandelion, diuretics; Pennyroyal (*Mentha pulegium*), carminative, Speedwell, alterative, Colt's-foot, demulcent, Linseed, emollient, and Poppy, Wild Lettuce, Hound's Tongue, anodynes. See also separate headings, and under **SPICES AND CONDIMENTS**.

Herculaneum, ancient city of Campania, Italy, the foundation of which was ascribed to Hercules. In A.D. 79, it was, together with Pompeii, destroyed by an eruption of Vesuvius. A second city was built and met with a similar fate (A.D. 472). During the sinking of a well in 1719 fragments of statues were unearthed, and later the theatre was discovered. Extensive recent excavations have been very successful. Over the site are built the villages Portici and Resina.

Hercules (*Heracles*), in classical mythology, the most famous and strongest of heroes, the son of Zeus and Alcmena, he was constantly plagued by Hera, the wife of Zeus, in revenge for the god's love for Alcmena. His

story is mainly taken up with the

Twelve Labours of Hercules
 (i) the slaying of the Nemean Lion
 (ii) the slaying of the Lernean Hydra
 (iii) the capture of the Arcadian Stag
 (iv) the slaying of the Erymanthean Boar
 (v) the cleaning of the Augean Stables
 (vi) the destruction of the Stymphalian birds
 (vii) the capture of the Cretan Bull
 (viii) the capture of the Mares of Diomedes
 (ix) the capture of the Girdle of Hippolyte
 Queen of the Amazons
 (x) the capture of the Oxen of Geryon
 (xi) the gathering of the Apples of the Hesperides and (xii) the capture of Cerberus

He married Delanera and when he left her for Iole his wife sent him the shirt which she had been told by Nessus the Centaur would restore him to her. The shirt however was poisoned and after suffering incredible torments he built a funeral pyre and laying himself upon it set light to it. He was taken up to Olympus. On the site of his ascension a temple was built and later his worship became general throughout the ancient world.

Herder Johann Gottfried von (1744-1803) German poet philosopher and critic studied at Königsberg where he was influenced by Kant and Hamann and where his first publications—poems and reviews—appeared. His *Fragmente über die neuere deutsche Literatur* (1767) showed his romantic tendencies. In 1769 at Strasburg he met Goethe and became the leader of the *Sturm und Drang* (qv) movement. At Weimar his greatest work appeared—a collection of folk songs—a review of Hebrew poetry and his *Ideen zur Philosophie der Geschichte der Menschheit* (1784-91). In this he follows Leibnitz in explaining evolution in terms of environment.

Heredia José María de (184-1900) French poet a member of the Parnassian school of whose views on poetry his *Les Trophées* (1893) is the best epitome. It is a collection of magnificent sonnets in which form, craftsmanship and feeling are com-

bined in the most polished verse of modern France.

Heredity In English law property which can be inherited. Hereditaments are either *corporeal* i.e. tangible which confer the present right to the possession of land either personally or through tenants or *incorporeal* which are intangible rights issuing out of land e.g. easements, advowsons, tithes, reversion (qv) etc.

Heredity Although many theories were advanced to explain the process of heredity no scientific quantitative experiments were carried out until the latter half of the 19th cent. when Mendel (qv) worked for 8 years on experiments with generations of edible peas. An account of his method and experiments will be found under Mendelism (qv) and here we shall consider an explanation of his results.

Mendelian Inheritance Summarising these briefly seeds produced by the cross pollination of tall and dwarf peas always developed into tall plants. These bred between themselves produced plants in the ratio of three tall to one dwarf. Certain of the tall plants were described as pure tall because when self pollinated they produced seeds growing into tall plants only. Others were impure tall plants for after self pollination they yielded both tall and dwarf plants in the same ratio as before. Dwarf plants either self pollinated or crossed with dwarf produced only dwarf plants in the next generation (see Fig 1).

The explanation is comparatively simple. Each plant arises from a cell formed by the union in the ovule of male and female germ cells or gametes. The characters inherited by the plant since they may resemble those of either parent must in some way be carried by the gametes and determined by the fertilised egg cell. If both gametes be derived from pure tall parents only the tall character can be represented in the germ cells. It cannot be too strongly emphasised that tallness itself is not a characteristic of these cells but that they carry something that

given favourable conditions, is able to determine the height of the plant. This "something" is described as the factor (see GINES) for tallness. If both gametes come from pure dwarf parents, each will carry the gene for shortness, but if a gamete from a pure dwarf parent fuses with one from a pure tall parent, the fertilised egg cell will contain one gene for tallness and one for shortness. Since Mendel's parent generation of peas consisted of tall and dwarf plants interbred, the next generation had both types of gene present. All the plants were tall, and as the shortness was completely prevented from appearing, the tall character was described as dominant and the short one as recessive. When the gametes of this generation were

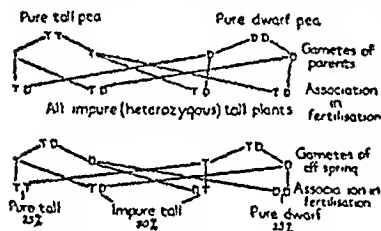


FIG 1

formed, each must have contained the gene for only one character, somewhere in the course of the division of the cells, the two genes were separated, and hence half the gametes carried the gene for tallness and half for the dwarf character. Thus a female gamete with the gene for tallness stands equal chances of being fertilised by a male gamete with a similar gene or with that for dwarfness. The female gamete with the factor for dwarfness stands similarly equal chances. The possibilities of association of genes in the third generation will readily be appreciated from the diagram.

Plants and animals receiving similar genes for a characteristic are said to be homozygous, those receiving the two alternatives are heterozygous. Pure

tall and pure dwarf plants are homozygous for tallness and shortness respectively, whereas impure tall plants are heterozygous (see Fig 1).

Linked Inheritance. *Drosophila*, the vinegar fly, is very suitable for experiments testing Mendel's laws, for it has several well-marked characters which can be indisputably recognised, it is easily kept in the laboratory, and has been bred under controlled conditions for over 20 years; it breeds quickly, and large numbers can be observed. While some of the characters have segregated and given results predicted by Mendelian laws, others have failed to do so. When a yellow female *Drosophila* with white eyes and a grey male with red eyes breed together, all their daughters have a grey body and red eyes, while the sons have a yellow body with white eyes. If this generation be interbred, all the daughters have eyes and body resembling their father's in colour, while the sons resemble their mothers in eye and body colour. In both the second and third generations, the grey body is always associated with red eyes and the yellow body with white eyes. There is not the free association that would be expected according to Mendel's second law. The genes for the grey body and red eyes are described as *linked*, and this linkage is rarely broken—in only 2 per cent of cases do yellow flies have red eyes or grey flies white eyes. This formation of new associations, by combining genes of different linkages, is known as "crossing over". Some of the most widely known linkages occur in connection with the sex of the parent, and an example of this is seen in the inheritance of colour-blindness, which is described as a sex-linked character. None of the children of a colour-blind father, and a mother with normal sight who does not bear a gene for the colour-blind character, will be colour-blind. All their daughters, however, carry the gene for colour-blindness, and must have received it from their father.

In the next generation if the father has normal sight and the mother bears the gene for colour blindness half the sons will have the defect and half the daughters will carry the gene for it. This gene can thus be carried undetected in the mother but if a son receives it he will be colour blind. Daughters are never colour blind unless they receive the gene from both parents.

Mechanism of Inheritance In all the examples considered the offspring develop from a fertilised egg-cell hence the genes must be in the nucleus or in the cytoplasm or in both. Since inheritance from father and mother is approximately equal and the sperm usually has a very small amount of cytoplasm compared with the egg cell the nucleus seems the more likely carrier of the genes. Moreover it has already been shown in the account of the cell (*q.v.*) that the nuclear division is no haphazard process but a very equal distribution of substance between the two daughter nuclei each receiving half-chromosomes in ordinary division of body cells and whole chromosomes in the reducing division preliminary to the formation of germ cells. These facts were known before Mendel's laws and shortly after the rediscovery of the latter it was suggested that the chromosomes might be the means of ensuring inheritance and that in the reducing division, the paired chromosomes were alternative one paternal the other maternal. The separation of alternative genes was secured by the passage of these chromosomes to opposite poles.

This theory that the genes are carried by the chromosomes is strongly supported by a large number of experimental observations. Firstly the number of chromosomes in each species is constant and secondly in all normal higher plants and animals and in many lower ones a reducing division is known to occur sooner or later in the life history and the gametes have consequently a set of chromosomes. This division pro-

vides a very suitable mechanism for the separation of alternative genes and in heterozygous types would account for half the egg cells and half the sperms bearing the gene for tallness while the other half carried the alternative gene for the dwarf character.

Explanation of Linked Inheritance

Since the number of chromosomes is small in comparison with the number of inherited characters each chromosome must carry a number of genes. The genes carried by any one chromosome would be definitely associated and in the reducing division would move together to one pole while all the alternatives of these genes would be in the paired chromosome passing to the other pole. This would account for the linkage of characters. Only those characters which were determined by genes in different chromosomes could be independently assorted in accordance with Mendel's second law. Thus if chromosome A carried the gene for yellow its alternative *a* would carry that for green and if chromosome B carried the gene for roundness its alternative *b* would carry that for the wrinkled character. In the reducing division A and B or *a* and B might pass to one pole while *a* and *b* or A and *b* respectively passed to the other forming the four types of gametes shown in fig. 2.

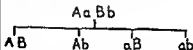


FIG. 2

Certain chromosomes usually termed X and Y chromosomes have been found definitely to be associated with the sex of certain animals. The female of some species has two chromosomes while the male has an X and a Y chromosome. This is the case in *Drosophila* and the female is described as homozygous for sex and the male heterozygous. The other characters

determined by genes in the sex chromosomes are said to be sex-linked, we have already seen an example of these in the inheritance of colour-blindness. Such a mode of inheritance may now be understood if we suppose the female to possess two X chromosomes and the male an X and a Y chromosome. Owing to the separation of alternatives, the egg cells of the mother will all contain only one X chromosome and the spermatozoa will contain either X or Y, the two kinds being equal in number. The Y chromosome never carries the gene for colour-blindness.

The explanation of the mode of transmission of this characteristic may now be seen from the diagram on p 193

In practice, the ratios shown may be disturbed, for since all the egg cells and sperms do not unite at the same time, and the family is so small, all or none of the daughters may be colour-blind, the same applies to the sons, but the theoretical ratio would be realised if the family were sufficiently large.

Crossing-over Disturbance of linkages is known to occur, and an instance of this has already been mentioned in the exceptional appearance of yellow specimens of *Drosophila* with red eyes, and of grey flies with white eyes. Normally, the grey body colour and red eyes are linked characters, while the yellow body colour and white eyes also are linked, and may act as alternatives to the former. For the association of grey body and white eyes to occur, the linkage of body and eye colour must have been broken in the paired chromosomes and an exchange effected. Observations have shown that when paired chromosomes are formed they may, when coiled and twisted, sometimes exchange part of their substance and so form chromosomes much more easily straightened out and ready for separation.

This exchange is described as crossing over, and it may take place at one or more positions on the chromosome

Since it is not only the genes themselves, but their interaction with one another, that determines characters, crossing over may produce results that are not predictable.

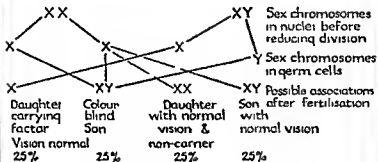
Variation (qv) arises from interference with the normal mechanism of inheritance. Two types are recognised, one due to the action of the environment and often described as fluctuation or continuous variation, and the other due to a change in the germinal material, called a mutation or a discontinuous variation. A dwarf pea given the most favourable environment possible will not grow nearly so high as a tall pea, but it will reach a much greater height than it would in an environment that barely favours subsistence. Such variations in height above and below the mean height for the species are examples of fluctuations. Mutations occur much less commonly than fluctuations, but examples of them have been found both amongst plants and animals: the exact mode of their occurrence is not known.

The power to vary is a property of living protoplasm, and variation and heredity work together. No two children of the same family are exactly alike. Since there are 24 chromosomes in the egg cells of woman and probably also in the spermatozoa of man, it is unlikely that two children of a family will receive exactly the same combinations of chromosomes, and the interaction of the different groups of genes may account for differences in behaviour as well as for physical differences. Moreover, characters may remain latent until an appropriate environment favours their development.

If a character he acquired can it be passed on? Lamarck (qv) thought that this was possible and was one of the chief factors in evolution. Strictly, an acquired character is a new character, not previously known to have appeared spontaneously in the ancestry of the individual, appearing as the result of the action of the environment (including food, poisons, drugs, and such agencies), and which persists after

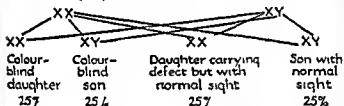
Mother carrying the factor
for colour-blindness

Father with
normal vision



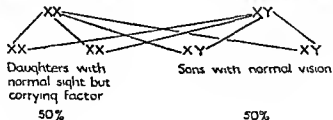
Mother carrying factor

Father colour-blind



Mother non carrier

Father colour-blind



the removal of the factors inducing it

In practice, some difficulty arises in distinguishing an "acquired" character from one that has been inherited but has remained latent until a favourable environment has enabled it to develop. For instance, a Chinese girl may have inherited genes for the development of large feet, but if her feet were bound in infancy, they would be unable to reach their full size, and though this development might be suppressed for generations, a child receiving the genes and allowed to develop normally would have large feet. The large size could not be described as an *acquired* character, for it was inherent. On the other hand, the smallness and distortion due to binding were acquired and were not inherited, since the binding has had to be repeated in every generation. Here then is an example of an acquired character which is not inherited. Sometimes in a family a child seems in certain ways to resemble no near ancestors. A familiar example is the appearance of a red-haired individual in a brown-haired family. The character for red hair is recessive, and will therefore not appear unless two genes for the same character are present, a probability of one in four, if both parents carry the gene for the character. If it be carried by only one, there can be no red-haired children, and several generations may pass before an individual with the recessive character mates with another individual carrying the gene. Thus it may seem that the red hair has appeared spontaneously, whereas really the genes have been passed on for generations, and if family pedigrees have been kept, one or more red-haired ancestors, more or less remote, can usually be found.

Experiments show that mutilations, and injuries due to the effects of drugs and poisons, are not transmitted. Weismann cut off the tails of mice for several successive generations, but the offspring of these mice had tails which had not even been shortened as a result of the experiment.

A mutant frequently breeds true in accordance with Mendel's laws, the mutant cannot be said to transmit acquired characters, for its ancestors did not show the mutant character. Some modification of genes must have occurred in the parent, and as a result the offspring showed a new character which the parent did not possess. This has been strikingly shown by Heston, Harrison, and Garrett, in their experiments on moths and butterflies feeding the larvae on leaves supplied with lead nitrate solution, these investigators were able to obtain races of insects with darker colouring than the normal parents, and the colour of the insects in one species behaved in breeding as a dominant Mendelian character. It is important to note that the insects feeding on the leaves with lead nitrate were normal in colour, and that some of their offspring were black, even though they were always fed on leaves free from lead nitrate solution. The new character therefore was not transmitted but lead salt must have affected some of the germ cells, and the resulting character in certain genes must have been responsible for the colour change in the whole, however, experimental evidence with regard to the inheritance of acquired characteristics is insufficient to be conclusive.

Biometry is the analysis of statistics determined by experiments in heredity, and was first used by Galton at the close of the 19th century in an attempt to discover the proportion contributed by ancestors to the inheritance of the individual. Some of the most eugenically important recent biometrical work is that of Goddard on the inheritance of feeble-mindedness, and there is no doubt that mental deficiency is transmitted, and it seems at least probable that intellectual power also may be inherited. Disease is not transmitted, though a tendency to contract certain diseases, e.g. consumption, may be inherited.

CONSULT. *Heredity in Man*, R. R. Gates, *Evolution, Genetics*

and Eugenics by H H Newman
Heredity by J A Thomson

Hereford, county town and cathedral city of Herefordshire. It is an important local market and manufactures an excellent cider. The cathedral begun in 1079 is of impressive beauty exemplifying all the developments of English Gothic architecture. As its name suggests (= lord of the army) the city was in early times of great military importance in relation to the Welsh Marches and both the Saxons and the Normans fortified it. After the conquest of Wales (153)



Hereford Cathedral

Hereford inevitably lost its early importance. Pop (1931) 4*00

Herefordshire Eng. county on the Welsh border. The Wye is its main waterway and is famous for the variety of its fish. Herefordshire is a fertile county devoid of outstanding hills, the bulk of the land being under corn and fruit cultivation. The apple flourishes and the cider of the county is a good source of revenue. Minerals and manufactures are negligible.

Apart from Hereford (40) the only other town of importance is Leominster (pop. 5700). The county is mentioned in the Saxon Chronicle 1051 and during the Wars of the Roses support was given to the Yorkists owing to the influence of the Mortimers. At Treago near Ross stands a fine example of a 13th-cent. fortified mansion. Area 810 sq. m. pop. estimated (1931) 111 755

Heresy

—house by

an individual of the school of thought most concordant with his personal beliefs in Christian theology applied to a belief or set of beliefs differing from those held by the main body of Christians. The followers of a heresy (e.g. Arianism q.v.) generally after a time formed a separate schismatic community and in the earlier history of the Church were often bitterly persecuted and sometimes eventually exterminated by the orthodox party.

Hereward the Wake Englishman of Lincolnshire partly a legendary but also a historical character who rebelled against the Normans and with the assistance of the Danes captured and looted Peterborough in 1070. At Ely Hereward and his fellow outlaws made a stronghold and held out there against a force of William the Conqueror's soldiers. Legends relate how he escaped the King's vengeance and lived to carry out more rebellions being eventually pardoned. His life is the subject of a historical novel by Charles Kingsley.

Hergesheimer Joseph (b. 1880) American writer born in Philadelphia. His fiction writing which shows strong descriptive power includes *Mountain Blood* (1915), *Jaca Head* (1919), *San Cristóbal de la Habana* (1920), *Quiet Cities* (1928), *The Party Dress* (1930) etc.

Heriot George (1563-1634) Scottish goldsmith. Sir Walter Scott's 'Jingling Georgie' in *Fortunes of Nigel*. He was jeweller to James VI and accompanied him to London from Scotland in 1603. He founded Heriot's Hospital in Edinburgh for the education of the sons of the city's freemen.

Herkomer Sir Hubert von (1849-1914) English painter born in Bavaria whence his father a joiner and wood-carver brought his family to England when Herkomer was 8 years old. The rest of his life was spent in England where he became naturalised. He studied at Southampton and later at St. James's Palace first exhibiting at the Academy in 1869. Ten years later he

was elected A R A and became R A in 1890. He was for a time Slade professor at Oxford. In 1907 he received a knighthood. His etchings and engravings gained great admiration, as well as his paintings. The Tate Gallery possesses examples of his work, including the portrait of Sir Henry Tate (1897).

Hermes, in ancient Greece, squared pillars, ending in a head of Hermes. They were not only used as mile and boundary-stones, but were objects of reverence, hence the panic in Athens at the mutilation of the Hermes on the eve of the Sicilian expedition (415 B C).

Hermann, see ARMINIUS.

Hermaphroditism is the production of both male and female gametes (*qv*) by a single individual. Hermaphroditism is characteristic of most flowers, they produce male gametes in the pollen grains of their stamens and female gametes in the ovules. While less common amongst animals, hermaphroditism is the normal condition of snails (*qv*), worms, hydra, and other lower invertebrata. The oyster and some other molluscs change their sex during their lifetime, but only when male and female phases overlap can the animal be regarded as exhibiting true hermaphroditism. Very occasionally, and then usually only partially, hermaphroditism occurs in human beings. See also BOTANY, SEX.

Hermas, Shepherd of. An early Christian hortatory treatise of uncertain authorship (c 130) which is a strong condemnation of the worldliness of Christians and an exhortation to repentance. The shepherd, who is an angel in disguise, comes to Hermas and tells him how he is to deliver the message. At one time the book was read in the churches. See Dr Taylor's English translation (S P C K, 1903-6).

Hermes [HER'MEZ], the Greek name for the messenger of the gods, called by the Romans Mercury (*qv*).

Hermes Trismegistus, an ancient and probably legendary Egyptian philosopher, the supposed author of over 40 works on religious, philosophical, and

scientific subjects. His name lives in the phrase "hermetically sealed".

Hermit (Gr *erēmos* = solitary), one who lives in solitary seclusion for the purpose of pious meditation and self-denial. Paul of Thebes, said to be the first hermit, passed 90 years in the desert. His example has been followed by many who believe a life of austerity to be truly Christian.

Hermit Crab, a marine Crustacean (*qv*) related to the lobsters, but distinguished by having the abdomen, or "tail," mostly soft, unjointed, and legless, and otherwise adapted to fit into the spiral shells of molluscs in which the hermit crab lives. The commonest British species is found in rock pools, usually in the shells of whelks. The young crab takes possession of small empty shells, often of the periwinkle, but as it increases in size it changes its abode for a larger one.



Hermit Crab

When hunting for food it crawls about with its adopted house, but when alarmed withdraws into it and blocks the entrance with its claws. Different species of hermit crabs are found in all seas. Some of them have sea-anemones attached to their shells.

Hermon, Mount, at the extreme end of the Anti-Lebanon range, Syria, often called Jebel-esh-Sheikh. Height, 9380 ft.

Herne the Hunter, in English legend, a huntsman who is said to haunt Windsor Great Park. A tree there, known as Herne's Oak, marked the scene of his hauntings, but it was uprooted in a storm in 1863, and another planted by Queen Victoria. Herne is mentioned in Shakespeare's *Merry Wives of Windsor*.

Hernia, see BOWELS.

Hero and Leander, two famous lovers in classical legend. Hero was a beautiful priestess of Aphrodite at

Sestos beloved by Leander Every night she would place a lamp in her window and Leander would swim from Abydos across the Hellespont (qv) to it. Finally one stormy night the lamp was extinguished by the wind and Leander was drowned Hero was so grief stricken that she cast herself into the sea The story has been told by Ovid Muscus Marlowe Chapman and Byron

Herod (1) **HEROD THE GREAT** king of Judæa (40 B.C.) founder of the Herodian dynasty After besieging and capturing Jerusalem at the behest of the Romans he rebuilt the temple

(2) **HEROD ANTIPAS** (4 B.C.-A.D. 39) the son of Herod the Great He put John the Baptist to death because he condemned Herod's marriage with Herodias the wife of his brother Philip

(3) **HEROD AGRIPPA I** (c. 10-44) made king of Herod the Great's domains by the Emperor Caligula ordered the execution of James the Apostle and imprisoned Peter

(4) **HEROD AGRIPPA II** (c. 6-100) fought with the Romans against the Jews in A.D. 67 He assisted in the siege and capture of Jerusalem and spent his later life in Rome

Herodas (or *Herodas*) (3rd cent. B.C.) Greek poet author of mimes in imitation of Sophron and Theocritus These are short dramatic scenes from ordinary life written in a curious metre the *scæron* or iambic and in quaint vivid language The dialogue is often coarse but contains masterpieces of characterisation

Herodians, a Jewish political party which supported the dynasty of the Herods They are mentioned in the Gospels as assisting the Pharisees against Jesus

Herodotus (484?-410? B.C.) the Greek historian father of history was born at Halicarnassus but lived mostly in Athens where his work was deeply appreciated His history deals with the rise of Greece and Persia and the great Persian wars of invasion (490 and 480 B.C.) he supplements facts with much interesting but unsub-

stantiated information concerning geography and customs gathered on his wide travels

Heroic Couplet, a rhymed couplet of ten syllable lines in English verse or of alexandrines in French verse forming a more or less self-contained unit of prosody As a medium of English verse it flourished particularly in the 17th and 18th cents

Heroic Romances a type of 17th cent prose literature which manifested itself mainly in France Beginning with the *1610* of Honoré d'Urfé they reached mature growth in Gomberville's *Polixandre* (1639) an absurd but ingenious portrait of Cardinal Richelieu as a hero much travelled in his search for an impossibly idealised princess Calprenède and the brother and sister de Scudéry continued this type of fiction which was in effect, a cumbersome and affected form of historical novel They were imitated in England one of the chief examples being the Earl of Orrery's *L'Athénassa* (1654)

Heroic Verse the name given on account of its usual subject matter to the dactylic hexameters of classical verse to the Alexandrine measure of French poetry and to the rhymed or unrhymed 10 syllabled verse of English prosody

Heroin (or *diamorphine*) a euphoric habit forming drug obtained artificially from morphine by the action of acetic anhydride It is employed medicinally in the soothing of coughs for which it is extremely efficient The drug is usually employed in the form of the hydrochloride Heroin is a favourite drug of addicts and in some countries such as the United States is totally prohibited even for medicinal use

Hérold Louis Joseph Ferdinand (1791-1833) composer of *Zampa* on the overture to which in England at least his fame exclusively rests Won Prix de Rome 1812 Wrote many successful operas and ballets including *La Fille mal Gardée*

Heron a large species of grey wading bird with a long bill neck and legs

It is still common in many parts of Great Britain, nesting typically in clumps of lugh trees in companies called heronries, or sometimes on the ground. Its food consists of fish, frogs, water-rats, small birds, etc. On the wing it has a slow flapping flight and keeps the head tucked back and the legs outstretched. Herons were formerly a favourite quarry of the falconer, who used the peregrine for the chase.

Heron (or Hero) of Alexandria (fl c 100 B.C.), Greek mathematician. He wrote several treatises, mentioning in one a machine which might be driven by steam.

Herpes Zoster (or Shingles), a disorder of the skin in which clusters of vesicles appear, often associated with a neuralgic pain. The vesicles are distributed in the skin over an area corresponding to the distribution of a sensory nerve. The cause is thought to be a virus infection (*q.v.*), and is in some ways related to the cause of chicken-pox (*q.v.*). Occasionally the small vesicles which normally contain clear serum also contain a little blood, the condition then being known as *hemorrhagic herpes*.

Herrera, Francisco (1570-c 1650), Spanish painter, surnamed *El Viejo*, best known for his *Last Judgment* in the Church of San Bernardo in Seville, and his *Vision of St Basil* in the Louvre, among his finest and most interesting paintings are those illustrating the life of the common people, his taverns and fairs and carnivals. His work is notable for its vigour and freedom, expressed both in design and in treatment. He is reputed to have been of a violent temper, and was for a time the master of Velasquez.

His son, **FRANCISCO HERRERA EL MOZO** (1622-1685), was also a painter and an architect. He left home on account of his father's irascibility, and remained in Rome until after his father's death. He painted many still-life pictures of fish, fruit, and flowers, and several ambitious works in the churches of Spain, but his painting is inferior to that of *El Viejo*.

Herrick, Robert (1591-1674), English poet, was in his youth a friend of Ben Jonson. In 1620, he was appointed Vicar of Dean Prior in Devonshire, where he wrote his songs on country life and customs. In 1633 these were published in *Hesperides* and *Noble Numbers*. His past lyrics are distinguished by their simplicity, tenderness, music, and humour. Each one is a polished gem. No poet has excelled him for charm and delicacy of touch, whether in spheres of Nature or of love poetry.

Herring, a familiar marine food-related to the pilchard and sprat, sometimes netted in such abundance in the North Sea that tons are used as field manure. The herring is essentially an open-sea species, but comes near the coast to spawn, its migration consisting mainly in its movement from deep to shallow water for this purpose. It differs from the pilchard and sprat in laying its eggs, generally over 30,000 in number, on the bottom. Its young, like those of sprat, are known as whitebait (*q.v.*).

Herring-bone: (1) (masonry) Set of two or more courses in a wall in which tiles or bricks are laid on a sloping opposite ways in successive courses. (2) Type of ornamental veneering in antique walnut furniture found at or near the edges of drawers. (3) A type of wood flooring. A kind of cross-stitch (see *NEEDLEWORK*).

Herrings, Battle of the (Hundred Years' War) (Feb 12, 1420). English under Sir John Fastolf, who were conveying provisions to the army besieging Orleans, successfully repulsed the attacks of a greatly superior force of French under the Comte de Montmorency at Rouvray. The English used the barrels of herrings which they were conveying as a defence, hence the name of the battle.

Herriot, Edouard (b 1872), French statesman. Became Professor of Rhetoric at Nantes, and later Lyons. In 1912 elected senator, and in 1916-17 Minister of Public Works.

a the Briand Government. In 1919 he took over the leadership of the Radical Party. Became Premier 1924-5 and upon his resignation was made President of the Chamber of Deputies. In 1928 at the fall of the Poincaré Government he resigned but later regained his seat and was leader of the Opposition until the elections of 1932 when he led his party back into power and became Premier a second time. He was defeated and resigned over the debt question later



M. Herriot

in the same year. He was for many years Mayor of Lyons, was defeated by a Communist in 1929 but re-elected at the next mayoral election.

Herschel, Sir Frederick William (1738-1822) astronomer. Starting life as a musician, he obtained in 1766 a post as organist at Bath and became director of musical activities in the then fashionable city. From a study of harmonics he was led to optics and thence to astronomy, building himself a small telescope. In 1780 he contributed two papers to the Royal Society

one on the variable star Mira and another on the lunar mountains. Between 180 and 1801 he contributed 6 papers on sun spots and raised issues that have not yet been satisfactorily cleared. He also observed the Polar ice on Mars concluding that that planet has season similar to our own. In 1811 he discovered Uranus and established the fact that the rotation of distant stars conformed to the laws of gravitation of the solar system. By no means the least of his achievements was the construction of a 40 inch telescope through which he discovered some of Saturn's satellites. He was knighted in 1816.

Herschel, Sir John Frederick William, Bart (1791-1871) English astronomer. He was the only son of Sir F. W. Herschel (q.v.). Educated at Eton and Cambridge he became Senior Wrangler in 1813. He entered Lincoln's Inn but began to study optics and astronomy assisting his father in the observation of double stars. He was knighted in 1831. After important astronomical work in the Northern Hemisphere he went to the Cape of Good Hope to study southern constellations. Returning in 1838 he was created a baronet. His next investigation photography and first applied the terms negative and positive to plate and print. In his last years he translated the *Iliad*.

Herschell, Farrer Herschell, 1st Baron (1831-1899) Lord Chancellor of England. He was called to the Bar in 1860 and in 1862 became a Q.C. From 1864 to 1865 he represented Durham in Parliament and was Solicitor-General 1860-9. In 1886 he became Lord Chancellor resigning 6 months later on the defeat of Gladstone's Government but from 1892 to 1893 he again occupied that office. He was Chancellor of the University of London in 1893 and Chairman of the Imperial Institute from its foundation. He died in Washington whither he had gone as a member of a boundary commission in 1898.

Hertford, on the R. Lea, county town

of Hertfordshire Its industries are malting, brewing, flour-milling, and printing Of ancient buildings a postern gate and embattled wall alone remain Its charter of incorporation was granted in 1555 Pop (1931) 11,376

Hertfordshire (*Herts*), an English county on the Middlesex and Essex borders of London The soil in many parts is chalky, and there are deposits of "London Clay" near Hertford There are 16 rivers, most important being the Colne and the Lea, and 3 canals, the New River, Grand Junction, and Aylsbury, the last-named being a branch of the Grand Union The climate is mild and dry, and agriculture is the main occupation, most of the cultivated land being under wheat and barley On a farm near Berkhamsted the first swede turnips produced in England were grown Other industries are straw plait, brewing at St Albans, Watford, Hertford, Baldock, and Tring, brickmaking, paper-making, tanning, and brush-making There are many fine roads in the county, the Great North Road, which leaves the Holyhead Road at Barnet, and the Holyhead Road, which passes St Albans, and leaves Hertfordshire near Dunstable, being the principal

Communications, exceedingly good, are provided by the L M S, L N E R, and London Transport

The S part of the county is in the Metropolitan Police District Hertford, with a pop of 10,000, is the county town Apart from Hertford the principal towns are Watford, St Albans, Cheshunt, Hemel Hempstead, Bishop's Stortford, Hitchin, and Barnet In churches and mansions Hertfordshire is rich, St Albans Abbey and the late Norman example at Hemel Hempstead being prominent At Hatfield and Knebworth are notable mansions Area, 630 sq m, pop (1931), 401,206

Hertz, Joseph Herman (b 1872), Chief Rabbi Born in Hungary, he emigrated to the United States of America as a child, and was educated there From 1898 to 1911 he was Rabbi at

Johannesburg, and was expelled by President Kruger during the S African War for his pro-British sympathies He became Chief Rabbi of the United Hebrew Congregations of the British Empire in 1913, and in 1925 was made one of the board of Governors of Jerusalem University He was awarded the Columbia medal for outstanding service in 1929, is a Vice-president of the League of Nations Union, and a Vice-president of the World Conference for International Peace through Religion His works include *The Jew as a Patriot* (1898), *The Jew in South Africa* (1905), *Affirmations of Judaism* (1927), and *Ancient Semitic Codes and the Moslem Legislation* (1928)

Hertzog, General James Barry Munnik (b 1800), S African soldier and politician He became a judge, and at the outbreak of the Boer War joined the Boer Army and rose to the rank of General He afterwards became Attorney-General, and Minister of Education in 1907, and Minister of Justice 1910-12 Excluded from the Cabinet, he formed a strong Nationalist Party which defeated General Smuts and came into power in 1924 with himself as Prime Minister For the next nine years he remained in office, an uncompromising opponent of General Smuts, the Imperialist leader, and was responsible for the adoption of the new flag in 1928 The economic situation grew so serious early in 1933 that he formed with Smuts a Coalition National Party, which was returned to power

Herzen, Alexander Ivanovich (1812-1870), Russian author, was exiled for his political views His Free Russian Press, established in London, published many revolutionary books, pamphlets, and journals that were smuggled into Russia He wrote several novels, but the *Memoirs* were his most important work

Herzl, Theodor (1860-1904), founder of the Zionist movement He was born in Budapest, and educated for the legal profession, which he forsook for

journalism Influenced by the anti Semitic reaction of the Dreyfus affair (1894) he published *The Jewish State* (1897) which advocated a theory of Jewish nationalism and which later led to the creation of the Zionist Movement His tomb in Vienna is the scene of a yearly pilgrimage on the anniversary of his death July 3

Hesiod (8th cent B.C.) the first Greek didactic poet His two known poems are *Works and Days* which contains advice on moral and agricultural matters and *Theogony* a history of the creation and of the gods *The Shield of Hercules* once supposed to have been written by Hesiod is probably not his

Hesperides in classical mythology the nymphs daughters of Hesperus and Atlas who had care over the golden apples given by Hera to Zeus at their marriage They lived in a beautiful garden abounding in fruits which has been placed near Mount Atlas (N. Africa) It was the eleventh labour of Hercules (qv) to capture some of the apples

Hesperus, in Greek mythology the god of the Evening Star and thus of the W where the sun sets His daughter Hesperia was mother of the Hesperides (qv) See also SOLAR SYSTEM

Hesse a republic of Germany comprising the districts of Oberhessen Starkenburg Rheinhessen Area 970 sq m It is watered by the Rhine Main and Fulda The soil is fertile producing cereal and root crops fruit vines and tobacco Minerals include iron salt and manganese Industrially its four large towns Darmstadt the capital Mainz Worms and Offenbach are chiefly concerned with the manufacture of machinery hardware leather goods furniture chemicals and wines

In the time of Clovis I it formed part of Thuringia afterwards passing to a Count of Hesse It was not until 1918 that it became a principality of the Empire and in 1953 was divided into Upper and Lower Hesse On the death

of Philip I (1567) Hesse was divided between his 4 sons who founded the Houses of Hesse Cassel Marburg Rheinfels and Hesse Darmstadt On the Houses of Rheinfels and Marburg becoming extinct the territory fell to the families of Hesse-Cassel and Hesse Darmstadt (qv) Hesse became a republic in 1918 Ludwig retiring and renouncing his power in 1919 It is administered by a Landtag of 90 members Pop (1933) 1,471,900 of whom two thirds are Protestants

Hesse-Cassel, former German electorate now a district in Hesse Nassau It was occupied by the French in 1806 incorporated with the Kingdom of Westphalia (1813) and was again an electorate in 1813 A number of insurrections in 1830 and 1848 led to concessions from the Elector who joined the Prussian union in 1849 only to secede the following year The constitution was modified in 1859 restored in 1860 but in 1866 the Elector sided with Austria He was defeated and his lands were annexed by Prussia

Hesse Darmstadt was separated from Hesse (qv) on the death of Philip the Magnanimous in 1567 In 1801 Louis X was compelled to cede several districts on the left bank of the Rhine receiving in exchange the Duchy of Westphalia Napoleon made it a Grand duchy in 1806 Political reforms were introduced in 1820 and 1848 and withdrawn in 1850 It joined the Austrian League which assembled at Frankfurt in 1850 By treaty (1866) some 20 sq m were ceded to Prussia and the navigation tolls on the Rhine and Main abolished During the revolution of Nov 1918 it was proclaimed a republic and now forms part of the German Reich

Hesse-Nassau, a province of Prussia with an area of 6500 sq m Pop (1933) 578,000 It is bounded E by Thuringia W by Rhenish Prussia N by Westphalia and S by the Hesse republic S face hilly with extensive forests well served by the R Main in the S and by smaller streams

elsewhere Chief mineral products are iron, coal, and manganese, with a little copper. There are no important agricultural products, but considerable viticulture on the lower slopes of the Taunus range. A fine breed of cattle is reared, and the timber trade is important. There are two fashionable health resorts—Wiesbaden and Homburg.

Hesse-Nassau was formed out of territories acquired by Prussia in the war of 1866. Its capital is Cassel, and its chief town Frankfort-on-Main.

Hessian Fly, one of the so-called gall-midges, the larva of which lives in the stems of wheat, frequently doing great damage to a crop. See also GALL INSECTS.

Hestia, the name of the Greek goddess of the hearth, called by the Romans Vesta (*qv*).

Heterocyclic Compounds, organic compounds of cyclic structure which contain elements in addition to carbon, not only within the molecule, but within the actual ring structure itself. The elements that thus occur within the ring are principally nitrogen, oxygen, and sulphur, and the heterocyclic compounds have considerable chemical resemblances to the homocyclic compounds (*qv*). An example of typical heterocyclic compound is pyridine (*qv*).

Heteropoda, see GASTROPODA.

Hetman, former Polish name for the Commander-in-Chief, beneath the King, of the National Army, this post was abolished in 1792. In Russian the equivalent is *alaman*, a Cossack chieftain, but the post has not existed since 1654.

Heulandite, see ZEOLITES.

Hevelius, Johana (1611–1687), German astronomer, founder of lunar topography. He travelled in England and France before settling in Danzig as a brewer. In 1639 he began to take an interest in astronomy, and in 1641 built an observatory, where he constructed a large tubeless telescope. He spent 4 years charting the stars, publishing his results in 1647. He dis-

covered 4 comets, and suggested the parabolic courses of such bodies. In Sept 1679 his observatory and contents were maliciously burned. Among his works were *Cometographia* (1665) and *Prodromus Astronomiæ* (1690).

Hewlett, Maurice Henry (1861–1923), English novelist, first became famous for his *Forest Lovers* (1898), a story laid in the Middle Ages. Many of his stories deal with Italy—e.g. *Little Novels of Italy* (1899), and *The Road in Tuscany* (1904). Two of his historical novels, *Richard Yea and Nay* (1900) and *The Queen's Quair* (1904), were very popular. His poems include *The Song of the Plow* (1916), *The Love of Proserpine* (1913), and *Flowers in the Grass* (1920).

Hexahn, a colourless organic liquid boiling at 161°C., manufactured by the complete reduction by catalytic hydrogenation of phenol (*qv*). The formula is $C_6H_{11}OH$. It is used as a solvent, and especially in the manufacture of soaps as a means of incorporating organic solvents in them.

Hexameter [HEKSA'MITŪ], see VERSE.

Hexapla, an edition of the Old Testament prepared by Origen early in the 3rd cent. A.D. It provided a critical text of the Hebrew, Septuagint, and six other texts in parallel columns.

Hexapoda, meaning 6-footed, a term applied to true insects (*qv*).

Hexastyle (architecture), Greek temple or other building with 6 columns at the front.

Hexateuch, the first 6 books of the Old Testament, so called to stress the unity of the Book of Joshua and the 5 preceding books, generally known as the Pentateuch.

Hexham, a town in Northumberland, England, on the R. Tyne, famous for its Early English priory church. The first church (built c. 678) was a Saxon cathedral. The Augustinian priory was built c. 1225. Other buildings of note are the 15th-cent. Moor Hall and the 14th-cent. Manor Office. The town is not far from Hadrian's Wall (*qv*), the Roman

on of Corbridge (*Corstopitum*)
m E. Hexham forms with New
a Roman Catholic bishopric
8890

Heyden, Jan van der (1637-171)
h painter Heyden spent most of
ife at Amsterdam where he was

His street-scenes are beauti-
d drawn with minutely handled
d subordinated to the structure
pleasant colour-scheme of the
le He also painted country land-
es and still life Specimens of his
c can be seen in the National
ery the Wallace Collection and in
y collections in Europe and the
A

ysse, Paul Johann Ludwig (1830-
y) German novelist poet and
wright lived at the Court of
milian II at Munich His novels
Die Kinder der Helt (1873)
Paradiese (1874) and *Mertin*
y) and among his plays are
Lange (1808) and *Maria von*
Ala (1803) He is best known
s short stories—e.g. *Das Buch*
Freundschaft (1883) He translated
e Shakespeare and some Italian poets
ned the Nobel Prize for Litera-
1910

ham, a port and watering place
ecambe Bay Lancashire since
incorporated in the borough of
mbe It is a L.N.S. packet
for Belfast and the Isle of Man
931) 60 0

ood, John (c 1500-c 1580 ?)
r writer of interludes a friend
omas More whose niece-by-
he married was a favourite
until the accession of Eliza-
He wrote 4 interludes *The*
led the forre P's The Plays of
r (printed 1833) *The Merry*
went the Pardo er and the
Curale and Naybore Pratt
1-33) and *The Merry Play*
than the H sbade Tyb the
d Sir Jhan the Preest
333) These are dramatised
or debates with much horse
coarseness

L. Thomas (1575 ?-1643 ?)

English dramatist was an actor and
playwright under Henslowe's manage-
ment and according to his own claim
was partly responsible for 700 plays
Those that survive are marked by
much humour and horse play and
passages of high poetic inspiration
and show him to have had a fertile
imagination They include *A Woman*
Kilde with Kindnesse (1603) *The*
Hiss Woman of Hoegsdon (1638) and
several chronicle play His other
works are histories in prose and verse-
didactic poems and translations

Hawatha (Háwōtā) traditional
N American Indian chief of the
Onondaga tribe who possibly lived
in the 15th cent He is credited
with the formation of the Iroquois
nation from 6 tribes and has been
invested with magical qualities as the
type of human progress He is the
hero of a famous poem by Longfellow

Hibernation (or *Hibernation*) is the
terpid condition in which certain
animals pass the winter in cold coun-
tries The phenomenon is of com-
monest occurrence in cold blooded
species whose temperature rises and
falls with that of the surroundings
but it is practised by a considerable
number of warm blooded Mammals
which normally possess the capacity of
keeping their temperature at approxi-
mately the same level irrespective of
the temperature of the air It is in
these that the physiological accompani-
ments of hibernation have been chiefly
studied and the principal changes are
as follows The temperature falls to
within a few degrees of that of the air
and the heart beat becomes slow and
feeble respiration almost stops the
alimentary canal and excretory organs
cease to operate but life is main-
tained by the absorption of fat stored
in the tissues during autumn

Hibernation is well illustrated by
the British fauna It is a matter of
common observation that during the
winter all insect life disappears A
great many individuals perish with
the onset of cold leaving eggs larvae
or pupae to carry on the generation in

the spring Others seek sheltered places in the ground, under fallen leaves, logs, or stones The same applies to spiders Worms burrow deeply into the soil Slugs bury themselves in the earth, and snails creep into crannies and close their shells with a membranous plate

The disappearance of insects on the wing in winter deprives bats of the source of their food-supply To overcome the difficulty they retire to caves, hollow-trees, or barns, and spend the cold months in a torpid state Of the three species of British Insectivorous Mammals, the hedgehog alone hibernates, being apparently unable to find in the winter sufficient food for sustenance Moles, on the contrary, can follow worms into the depths of the soil, and shrews are enabled by their small size to explore the crannies and secret places where hibernating insects have hidden Of the British rodents, hares, rabbits, field-mice, voles, and squirrels do not hibernate, but the dormouse, whose feeding habits are tolerably like those of squirrels, is a notorious "sleeper" Foxes, weasels, and stoats have no occasion to retire to winter quarters, since rabbits, mice, voles, and birds are obtainable for food, but the comparatively inactive badger regularly lies up

British Reptiles and Amphibians—the snakes, lizards, frogs, toads, and newts—being cold-blooded, become lethargic at the end of autumn and retire to winter-quarters, frogs taking shelter in the mud at the bottom of ponds and ditches But aquatic animals do not hibernate in the strict sense of the word.

The laws which govern the hibernation of animals in Great Britain hold good in other temperate or more N countries, where the cold is as severe or severer Amongst hibernators not found in England perhaps the best known are the N brown and black bears and the marmots It may be recorded that Arctic hares and foxes, although exposed to intense cold, remain active all the winter

In tropical districts, subject to recurring hot periods of drought, when rivers run dry and vegetation is parched, a phenomenon similar to hibernation, but known as *æstivation* (*qv*) or "summer sleep" enables many animals to live through the unfavourable conditions, and when the water in which they live becomes exhausted, tortoises, frogs, and even crocodiles sometimes bury themselves deep in the mud until the return of the rains Several freshwater fishes, like cat-fish and lung-fishes, behave in the same way.

Hibiscus (bot.), a large and widely distributed genus belonging to the mallow family. Many species are grown for ornament, having large showy flowers Others yield useful materials, such as fibres, oils, etc The pods of *Hibiscus esculentus*, called Okra, bamia, or Lady's fingers, are a favourite vegetable in the Near East Manihot is a greenhouse Rambler with yellow flowers belonging to this genus *Syrriacus* (*H frutex*) is a hardy deciduous shrub with purple flowers in late summer, which grows well near towns, on an enriched sandy loam, and is propagated by cuttings started in a cold frame

Hichens, Robert Smythe (b 1864), English novelist and playwright, published his first book, *The Great Carnation*, in 1894. He succeeded best in tales of the Orient. *The Garden of Allah* (1905; dramatise 1920), *The Call of the Blood* (1906), and *Bella Donna* (1909, dramatise 1911-12) Others of his novels are *The Way of Ambition* (1913), *December Love* (1923), and *Doctor Ariz* (1929)

Hickory, N. American tree related to the walnut The wood is of great strength, and is used for handles of tools, large screws, etc There are several species, all similar to each other in having pinnate serrated leaves and nuts resembling the walnut

Hicks, Edward Seymour (b 1871) English actor-manager and writer Originally intended for the Army, he went on the stage in 1887, becoming

chief comedian at the Savoy Theatre in 1893. He originated the system of concert parties at the front during the World War. He has written and produced 61 plays touring with his own company in Africa, Australia and Canada. His plays include *Catch of the Season*, *Sporting Life*, *Good Luck* and *The Man in Dress Clothes*.

Hidalgo, formerly a Spanish title given to the lowest rank of nobility entitled to use the prefix *don* and now signifying one of gentle birth without other qualification. The word has had much the same history and meaning as the English *gentleman*.

Hide, a unit of land measuring c. 120 acres (according to some scholars 100 acres) was a unit of taxation in the early Middle Ages. The hide was divided into 4 virgates of c. 30 acres, the general holding of a villein.

Hieroglyphics (sacred writing). Greek name for the ancient Egyptian system of writing known and practised only by the priests. This was not alphabetical but was a system of picture writing and so the term hieroglyphics is often applied generally to any similar system of ideographs. The ancient Egyptian hieroglyphics did not disclose their meaning to modern scholarship until in 1799 the discovery of the Rosetta stone (q.v.) provided the necessary key. It is believed that the Egyptian hieroglyphics were the ultimate parent of all the Semitic and Indo-European alphabets. *See also* ALPHABET, TRANSCRIPTION.

High Commission, Court of, was established in 1534 by Elizabeth, with jurisdiction over all ecclesiastical matters. It gradually assumed and abused the power to fine and imprison the laity and having become tyrannical and unconstitutional, was abolished in 1641 under Charles I. Restored by James II in 1686 it was finally abolished 3 years later.

Highgate, a suburb of London largely residential served by tube tram and bus. It has a large public school. In the vault beneath the

chapel of Highgate School is the grave of S. T. Coleridge. A stone on Highgate Hill marks the spot where Dick Whittington is said to have sat when he heard the sound of Bow Bells recalling him to London. In the famous cemetery Karl Marx, George Eliot and others are buried.

Highlands, the mountain regions of N. Scotland consisting essentially of a dissected granitic plateau of great age. The most pronounced feature is the N.E.-S.W. trend of the valleys strikingly illustrated in the great fissure of Glen More which roughly bisects the system. The Highlands are separated from the mountains of the Scottish border by a deep rift valley comprising the whole of the Lowlands.

Highness, a title of dignity applied to various ranks and stations. Used by the later Roman and Greek Emperors it was applied in the Middle Ages to dukes and princes. In England it was taken by the King and Queen alternatively with *Majesty* until the time of James I when the latter title became official. Cromwell assumed it as Lord Protector. Today the children, brothers, sisters, uncles and aunts of the reigning sovereign together with the children of his sons and the grandchildren of the Prince of Wales in the senior line bear the title His (or Her) Royal Highness (H.R.H.).

High Seas, those parts of the sea outside territorial waters (q.v.). Also called the open sea for no nation has any rights of sovereignty over it. That principle however was not admitted till fairly late. Spain claimed the Pacific Ocean and the Gulf of Mexico. Portugal the Atlantic S. of Morocco. England claimed rival rights and exacted a salute to her flag from Cape Finisterre in Spain to Stadland in Norway. The principle of the freedom of the seas was first proclaimed by Grotius in his *Mare Liberum* i.e. the open sea to which Selden replied with his *Mare Clausum* i.e. the closed sea in support of the

are still made from time to time

High Treason, see **TRFASON**

Highway, in England, any through road of importance, in the U S A, the term has particular application to a network of national roads, the first of which, from Washington to Santa Fe, was begun in 1802. Most were constructed with the aid of the States until the Federal Highway Act of 1921 brought the United States Government again into road-building. To-day c 100,000 m out of 300,000 m of State roads are called United States Highways. See also **TRANSPORT**, **ROAD TRANSPORT**

Hilary Term, formerly one of the periods during which the superior courts of justice were open, this is now the Hilary Sittings, lasting from Jan to the Wednesday before Easter. It takes its name from St Hilary, Bishop of Poitiers in France in the 4th cent, whose feast is Jan 14.

Hilda, St. (614-680), Northumbrian saint, was converted by Paulinus, 633, and entered a nunnery. In 657 she founded the Abbey of Whitby, for both monks and nuns. She exercised great influence in Northumbria.

Hildebrand, Adolf von (1847-1921), German sculptor, born in Marburg, he studied at Nuremberg, Munich, and Berlin. Much of his life was spent in Italy. His work was much admired, and he designed a number of fountains and public monuments in Germany, in which he endeavoured to combine the principles of classical sculpture with lifelike realism. He also modelled a number of portrait busts. His book, *Das Problem der Form*, as well as his work, exerted considerable influence in Germany.

Hildesheim, town in Hanover, Prussia. Its industries are the manufacture of agricultural implements, bell-founding, sugar-refining, brick-making, brewing, and tanning. Hildesheim became a member of the Hanseatic League in 1241. Among its

cent, and the fine timbered butchers' guild house. Pop (1933) 63,200.

Hill, Octavia (1838-1912), pioneer English social reformer who, aided by John Ruskin, took a practical interest in the housing conditions of the poor. She organised charity and improvement societies, published propagandist works, and was one of the first women to sit on a Royal Commission.

Hill, Sir Rowland (1795-1879), the initiator of the penny post. As a young man he taught in his father's school. He was forced by ill-health to give up teaching in 1833, and in that year conceived his plan for reforming the postal system. In 1839, after some opposition in Parliament, penny postage was adopted. Hill was appointed to the Treasury in the same year, but was forced to resign with the formation of the new cabinet in 1842. He received an award of over £13,000 in recognition of his work, and was knighted 1860.

Hillel (*Hazaken* "the elder" or *Hababli* "the Babylonian"), (c 75 B C - A D 10), famous Jewish rabbi of Babylonian origin who, through the profundity of his wisdom and gentle, loving character, resembled Christ. It was not until Hillel was growing towards middle age that he began to study in the schools of Shemarlah and Abtalion in Jerusalem, but he soon became famous. He founded a school which was opposed to that of his contemporary, Shammai, and is the author of many beautiful sayings touching the virtues of piety, charity, and humility.

Hiller, Ferdinand (1811-1885), German pianist and composer, a pupil of Hummel and infant prodigy. Was a favourite with Paris audiences and a friend of Mendelssohn. Besides a considerable output as a composer, Hiller wrote and lectured on musical subjects.

Hilliard, Laurence (d 1640), English miniature-painter, son of Nicholas Hilliard (qv). Very few examples of

his work remain but these are as valuable for their beauty of workmanship as for their rarity

Hilliard, Nicholas (c 1540-1619) considered to have been the first of the English school of miniature painters. He engraved the Great Seal of England in 1596 being goldsmith, carver and portrait painter to Queen Elizabeth.

Hilversum, a town and important radio station near Amsterdam Holland. Its chief manufactures are carpets and floorcloth. Pop (1937) 59,632.

Himalaya, the great Asiatic mountain system which forms the S buttress of the Tibetan plateau overlooking the plains of Hindustan. The ranges are roughly defined E and W by the valleys of the Brahmaputra and Indus and run in a convex S curve for c 1500 m with a width of from 100 to 150 m. There are three main folds: the S foothills with an average height of c 3500 ft are succeeded by the middle ranges (12,000-15,000 ft) and N by the huge ranges of the Mustang and Great Himalaya which form the principal watershed. These last in-

clude the loftiest peaks in the world: Everest (29,141 ft), Godwin Austen (8,250 ft), Kanchenjunga (28,146 ft), and many others with a height of over 20,000 ft. Between the outer ranges are the fertile valleys of Kashmir, Nepal and Bhutan. The Himalaya is of comparatively recent origin. The mountains are composed of sedimentary marine rocks elevated from the bed of a primeval sea at a time when peninsular India had long been dry land. The main river valleys do not conform to the present system of folding and were evidently formed at a very early stage in the evolution of the range. Earthquakes still occur especially in the S valleys.

Communications. Caravan routes traverse the Himalayan system by high passes and a steady trickle of trade has flowed from Central Asia and China into Hindustan since early times. Although the stupendous barrier proved no permanent obstacle to invading armies in the past, the difficulties in constructing modern roads and railways are immense both from



Labour in the heart of the Himalayas bordering Tibet. The Muz Road, 10,000 ft. level.

the vast scale of natural obstructions, and for political reasons. Rainfall is heaviest in the E mountains, and decreases N. The summer monsoon, however, brings a fairly heavy fall to the whole range. In spring, intermittent W storms of varying force prevail. The summer snowline is at 15,000-16,000 ft on the middle ranges, in the Great Himalaya the limit rises to 18,500 ft, and in places to 20,000 ft. The healthiness and moderate temperature of the middle region on the Indian slopes has led to the establishment of sanatoria, such as Simla and Darjeeling. For *Flora and Fauna* see ASIA.

Exploration. Owing to political difficulties and the vast and intricate nature of the system, the Himalayas have been only partially explored. The surveying expeditions of Lord Conway, the Bullock Workmans and others, have cleared up the topography of certain areas, and much knowledge has been added by the journeys of Sir F. E. Younghusband, the Hon. C. G. Bruce, Dr. Longstaff, Dr. Kellas, and recent expeditions. Attempts on the summits of the principal peaks have also been made, of which F. W. Mummery's fatal attack on Nanga Parbat was the earliest. See also ABRUZZI, LUIGI, AMLDEO, EVEREST, KANCHENJUNGA, and KAMET.

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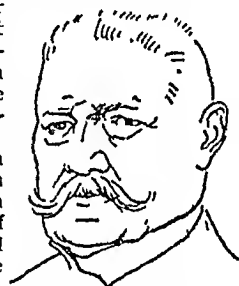
Himera (Sicily, Battles of). (1) 480 B.C. the Syracusans under Gelon defeated Hamilcar and the Carthaginians, who were invading Sicily. Hamilcar was slain. (2) 409 B.C. the Carthaginians under Hannibal took the town, sacked it, and massacred 3000 of the inhabitants.

Hind, Lewis (1862-1927), essayist and critic. He was a sound rather than

a brilliant art critic, but did valuable work for literature in encouraging the early work of Bennett, H. G. Wells, Francis Thompson, and others. His published work includes *The Enchanted Stone*, *Adventures Among Pictures*, and *Naphtali*.

Hindemith, Paul (b. 1895), German composer, was born at Hanau, and studied at Frankfurt. Played the viola in a string quartet. He is best known in England for his chamber music which has made a more favourable impression than many other advanced works. Has written three one-act operas. Hindemith is regarded in his own country as one of the most outstanding of the new composers.

Hindenburg, Paul von (b. 1847), German soldier and President of the Republic, was born at Posen, the son of an infantry officer. He fought with distinction in the Austrian campaign of 1866 and served in the Franco-Prussian War.



President Hindenburg

(1870-1). In 1878 he was appointed a member of the general staff, joined the War Ministry (1889) and, after being placed in command of the 4th Army Corps (1905), he retired in 1911. In 1914 he was given command of the Eighth German Army, his chief of staff being Ludendorff. After his great victory over the Russians at Tannenberg in Aug. 1914 he was given the supreme Eastern command, and in 1916 he assumed command of the entire German Army. After the Armistice he retired. His popularity as a national figure resulted in his election to the presidency of the German Republic in 1925.

Hindenburg Line, Battles of (Aug.

-8-Oct. 5 1918) the battles in the Allied offensive of 1918 in the World War (q v) ending in the capture of the Hindenburg Line the last German line of defence which ran from St Quentin to a point E. of Arras. The plan of offensive was for attacks to be launched simultaneously from W. of the Meuse and Argonne to Mézières in Flanders towards Ghent and in the centre towards Maubeuge (the most vital attack in the campaign). The attack was launched Sept. 22 against the weaker portion of the line in the direction of Ribecourt while the main attack was to be launched after a heavy bombardment the next day. The British First Army succeeded in forcing the Hindenburg Line and reaching Anneux. On the 28th Paillet and Bourlon were reached. The main attack was launched on the 29th by the Fourth Army against the front between Bantouzelle and Vendhuile. By nightfall the line was broken through. The attack continued until Oct. 5 when the Hindenburg Line was in British hands and the way open for the advance on Maubeuge.

Hindi [ɦɪndi] Languages. The, are divided into 2 branches each descended from a different form of Prakrit (q v) (1) **EASTERN HINDI** the most important member of which that spoken in Oudh has a large literature

dialects of which the Braj Bhasha of the district near Muttra is the standard and that spoken near Delhi the parent of Hindustani (q v)

Hinduism, a wide term which not only embraces the religious observance



The God G. esa.

but also the social institutions of over 200 million Indian peoples. Hinduism generally includes Brāhmanism (the earliest form of Indian religious observance) with which it is in many ways closely allied, but Brāhmanism (i.e. the religion of Brahma the Creator) is in its purest aspect monotheistic while Hinduism is polytheistic. Hinduism comprises 8 philosophical systems which were evolved from the worship of Brahma the one supreme being. These systems are (1) the Vedānta founded by Vyāsa, (2) the Mīmāṃsā founded by Jaimini, (3) the Sāṅkhya founded by Kapila, (4) the Yoga founded by Patañjali, (5) the Nyāya founded by Gautama and (6) the Vaiśeṣika founded by Kaṇāda. The *Mahābhārata* and the *Rāmāyana* two epic poems are the sources of much information and inspiration for the later ancient lore which came to be written.

The Hindu triad consists of Brahma the Creator, Vishnu the preserver and



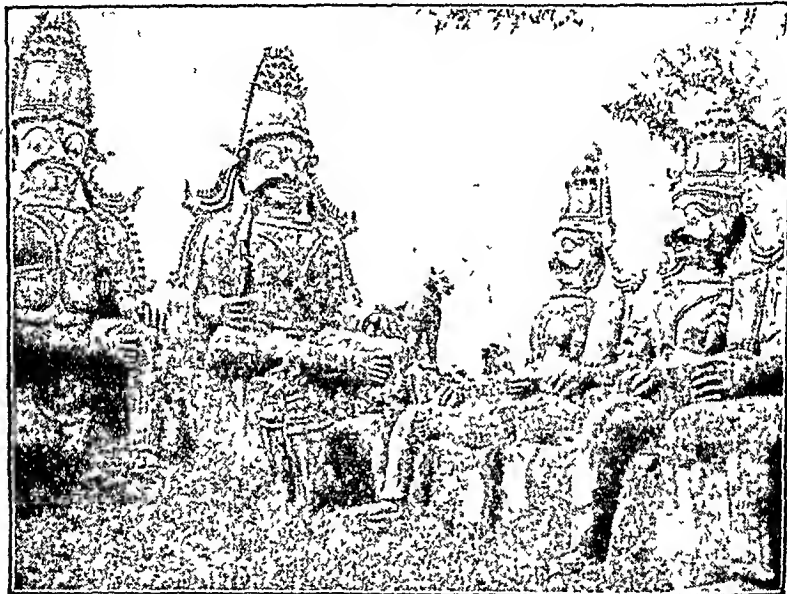
Hindu Temple Gwalior

in which the most prominent author was Tulsī Das in the 16th cent. (2) **WESTERN HINDI** has 4 important

Siva the destroyer; but of the many sects that have evolved from the special worship of one or other of the three aspects of this trinity, the two most important groups are the Vishnuites and the Sivaites. Vishnuism declares Vishnu to be the one God, yet recognition of all the other divinities of the Hindu pantheon is also held. Vishnu, it is believed, has been incarnated many times, his chief mani-

and Sivaism are different facets of one and the same doctrine, and not wholly antagonistic. Hinduism, however, does not comprise only these two sects: there are many minor cults. Hinduism contains many sublime truths, stressing the belief that the physical world is a world of shadows, and that reality which can be spiritually apprehended cannot be seen by mortal eyes.

See L. D. Barnett, *Hinduism* (1906).



Group of Hindu Gods near Salem, S. India, made of hollow earthenware, ranging in height from 16 to 20 ft.

festations being Rama and Krishna. The adherents of Siva also hold that Deity to be the one God, yet other gods are also recognised. Both sects worship idols, the *lingam* (phallic symbol) being one of the characteristic features of the worship of Siva.

Another feature of these two sects is the high place occupied by the disciples' *gurus* (or teachers) who are regarded as gods. Brahma is worshipped by a comparatively small group of Hindus, whilst Vishnuism

J. Robson, *Hinduism and Christianity* (1905), etc.

Hindu Kush, mountain range of Central Asia, stretching from the Pamirs for c. 350 m. to the N. of Kabul. On the Central border stands the highest peak, Tirach Mir (25,400 ft.). Its general direction is W.S.W. to E.N.E., and for some 200 m. from its E. extremity it forms the S. frontier of Afghanistan. The Hindu Kush was crossed by Alexander the Great in his campaign against the Persian

king Darius III and his successor Bessus

Hindustan (**HINDUSTAN**) the land of the Hindus a Persian term for the Indian peninsula

Hindustani (or *Hindustani*) **Language**, a development from a dialect of W. Hindi (q.v.) which has become the *lingua franca* of India. It is known under this name to Europeans but by the natives it is usually called Urdu (q.v.)

Hindustani Literature includes the writings of Early and Middle Hindi as well as those of literary Urdu. Early Hindi literature (c. 1100-1500) consists of poems recording the old legends of Rajputana the poems of Chand Bardai and Malik Mohammed and the religious literature of the Vaishnava saints. The Middle Hindi period (c. 1550-1800) is the golden age of Hindi poetry the age of Tulsi Das (q.v.) and Sur Das. But Hindustani literature properly so called did not begin until Urdu became a literary language at about the end of the 16th cent. It differed from Hindi mainly in the forms of its prosody which was derived from Persian rather than Hindi models for it took over from Persian such forms as the *rubai* (sepiq am) *ghazal* (love poem similar to the sonnet) and *gasida* (ode of praise). Rafi Saadi and Mir Taqi both of the 18th cent. are the best known Hindustani poets before the modern period the former wrote satires and the latter sonnets and narrative poems. Prose literature did not develop until early in the 19th cent. when Calcutta became a great literary centre and fiction and journalism towards the end of the 19th cent. The drama has not yet grown to maturity. See Dr G. A. Grierson's *Modern Vernacular Literature of Hindustan* (1889).

Hinkler Bert (189-1933) Australian aviator. His more notable flights include London-Turin on a 9 h.p. machine England-Australia in 15 days New York-London across the Atlantic via Brazil and W. Africa. He crashed and was killed in the

Apennines in Italy while trying to make a record flight to Australia. Hinkler was elected to the British Schneider Trophy team but did not fly in 1935. His decorations included the Air Force Cross and Distinguished Service Medal.

Hinny the offspring of a stallion and a female ass distinguished from a mule which is the offspring of an ass stallion and a mare.

Hipparchus (fl. 160-130 B.C.) Greek astronomer born at Nicaea in Bithynia. He made observations from the island of Rhodes and was the first to discover the precession of the equinoxes. His astronomical knowledge was based upon that of the Chaldeans.

Hippocras, see **AMARULLIS**.

Hippo, a one time flourishing maritime city of Numidia founded by the Tyrians afterwards an important Roman colony in Algeria N. Africa. St. Augustine was appointed bishop c. A.D. 400. Its site is occupied by the modern Bona with pop. (1931) 68,778.

Hippo Siege of (May 430-July 431) the Vandals under Genseric after a 14 months' siege took the city from Boniface Count of Africa and burnt it.

Hippocrates (c. 460-c. 378 B.C.) the father of medicine born on the island of Cos Asia Minor. Little is known concerning him and of that little much is legend. He travelled widely taught and practised in Thrace Thessaly Delos and Athens and developed a science very widely differing from the healing art of the Temple of Cos. Aristotle mentions him once only but the *Hippocratic Collection* of books speaks for itself. These works were in use in the Alexandrian Medical School 300 B.C. and as even then the master was highly venerated and all laudable contributions were attributed to him so from the very beginning the man was merged in his work. It was Hippocrates who separated medicine from philosophy and made his observations without allowing himself to be biased by the notions concerning the

functions of the human body that were current at the time

His aphorisms begin with "Art is long and life is short," and though he is sometimes very wrong, he is never superstitious. In surgery he was up-to-date, instructing "the nails of the operator neither to exceed nor come short of the finger-tip . . . practice (to attain) ability, grace, speed, painlessness"

His students were forced to take an oath of secrecy concerning their patients' cases, a practice which is still in vogue to-day

Hippocrene [HI'PÖKRĒN] (the horse's fountain), a fountain sacred to the Muses, near Mount Helicon, so called because it sprang from a hoof-mark made by Pegasus (q v)

Hippodamus of Miletus, Greek architect of the 6th cent B C, employed by Pericles on town-planning. The town of Piræus and the city of Rhodes were both built after his designs. He seems to have forestalled American ideas, his towns being composed of broad straight streets intersecting at right angles

Hippodrome. (1) Greek equivalent of the Roman *arena*, a course for horse- and chariot-racing, with fixed seats for spectators, usually made in the shape of an ellipse, with the curve at one end cut off square. (2) In modern times, a theatre or more commonly a music-hall

Hippolytus, in Greek mythology, the son of Theseus and Hippolyte, the Queen of the Amazons. He was beloved by his stepmother, Phædra, but when he refused her advances, she denounced him to Theseus, saying that he had violated her. Hippolytus fled from his father, who prayed to Neptune to punish him. The sea-god sent a monster after Hippolytus, which terrified his horses, so that he fell from his chariot and was killed. His fate is the subject of a tragedy by Euripides

Hippolytus (fl c 180-240), early Christian writer and martyr, presbyter of the Church at Rome, and afterwards head of a separate church, styling himself Bishop of Rome. Author of

Philosophumena (*Refutation of All Heresies*) and *Christ and Antichrist*, which contains an account of the events of the early 3rd cent

Hippolytus, Canons of, a collection of Church orders and regulations compiled c the 4th cent. It is doubtful whether Hippolytus is the author, most probably the canons are a compilation of the practices of the early Egyptian Church

Hippopotamus, meaning River Horse, a large aquatic mammal representing a family constituting, with the pigs, the non-ruminant division of the order Artiodactyla or even-toed ungulates (see UNGULATA). Hippopotami, although formerly found in Europe, even in the Thames, are now restricted to Africa, where two species exist, the large or common, and the pigmy. The latter is comparatively small, measuring c 3 ft high and 6 ft long, and is found only in the forests of Liberia. It is not so heavily built as its larger ally, and is more fitted for life on land. The larger species, which is c 5 ft. high and 12 ft long, with a girth about equal to its length, was formerly plentiful in Lower Egypt, and is supposed to have been the Behemoth of Scripture. It is still found in the Upper Nile, and is fairly plentiful in the other large rivers and swamps of tropical Africa, but is being eradicated from the settled districts, on account of its destruction of cultivated crops. Its natural food is grasses and water weeds, which it digs up by means of its long tusks. It is perfectly at home in the water and spends the greater part of the day submerged with only its eyes, ears, and nostrils above the surface, or lying on the shady banks of the river. The young, of which there is usually only one, is born on the land, but soon takes to the water, where it is carried on its mother's back to protect it against crocodiles

Hirohito (b 1901), Emperor of Japan, the son of Emperor Yoshihito. He visited Europe and the United Kingdom in 1921, and in the same year was made prince regent. He married

Princess Nagako in 19th and ascended the throne in 1906

Hiroshige (1797-1858) Japanese artist whose real name was Andō Tokitarō. Two of Hiroshige's pupils Hironobu and Andō Tokubei were surnamed respectively Hiroshige II and Hiroshige III and it is not easy to distinguish between the work of the three men who together with Hokusai are recognised as the greatest of Japanese artists. The medium in which they worked was colour block printing and their subjects were mostly landscapes and natural phenomena such as waves or rain. The essential truth to nature of their compositions and their infallible sense of design place their works high in the ranks of artistic achievement. The fashion for Japanese art introduced into Europe largely through the work of Whistler has made the name of Hiroshige almost as famous in England as it is in Japan.

Hiroshima, a city in Honshu Japan. Its principal industries are the manufacture of bronze ornaments, lacquered ware and other objects of art. Some 14 m. S.W. is Miyajima or Itsukushima, the sacred island of Light with its renowned Shinto temple. Pop. (1930) 270,417.

Hirsch, Baron Maurice de (1831-1896) German Jewish philanthropist remembered for his creation of the Jewish Colonisation Association which he endowed with a sum of over £9 millions. The Association was founded to promote the agricultural settlement of Jews in all parts of the world. It now devotes most of its attention to settlement in Palestine. It is estimated that Baron de Hirsch devoted in all no less than £5 millions to philanthropic purposes.

Baron de Hirsch was a member of the banking firm of Busschoffsheim and Goldschmidt of London. Paris and Brussels lived much in England and was a friend of King Edward and was a leading racehorse owner. He said that he raced for the London Hospitals and in 1899 when his filly La

Fleche won the Oaks the St Leger and the 1000 Guineas his turf winnings for the London hospitals came to £40,000.

Hirst, George (b. 1871) Yorkshire and All England cricketer now a famous coach engaged at Scarborough. He played first-class cricket for 24 years and retired in 1921. He made more than 30,000 runs and took more than 2,000 wickets. He established a record in the 1906 season by scoring 38½ runs and taking 208 wickets.

Hislop, Joseph (b. 1887) British operatic tenor made his début at the Royal Opera Stockholm in 1914 where he became one of the most popular artists. At his first appearance at Covent Garden in one of the early post-war seasons his intelligent acting, cultured style and above all the warmth and beauty of his lyric tenor made a great impression. He has since become one of the most popular artists in France, S. America and the United States.

Hissarlik *see* **ÆGEAN CIVILISATION**
Histamine is obtained from the putrefaction products of proteins and also from histidine by bacterial action. It is also found in ergot and has a contracting effect on the uterus for which it has a specific affinity. Histamine is one of the causes of surgical shock. It is a decomposition product of proteins and the collapse that occurs after extensive burning is to a great extent due to large amounts of histamine being liberated into the blood stream where it has the effect of causing a considerable fall in blood pressure. *See also* **CIRCULATORY SYSTEM**, **COSMETICS**.

Histidine, an amino acid obtained by the decomposition of proteins is one of the amino acids essential for the proper nutrition of the animal body.

Histology, the study of the structure of cells forming the various tissues (qv) of plants and animals. It considers the cell as a whole and distinguishes different types of cells such as muscle, nerve and bone of animals.

bast, wood, and cork of plants See also ANATOMY; CYTOLOGY.

History. This word has undergone a number of changes in meaning. Originally it was concerned with description, without being particularly related either to human behaviour or to chronological sequence in events. A survival of this use is found in the expression, *Natural History*.

It later came to mean a record of events and, by looseness of usage, was finally applied to the events themselves.

Narrowly interpreted, it covers the activities of man, with reference to particular events placed in chronological relation to each other. The word is more broadly used to embrace an account of everything that undergoes change, and the modern tendency is to fit the history of man into a wider conception of physical and social evolution. This is developed especially in H. G. Wells's *Outline of History*.

Read B. Croce, *Theory and History of Historiography* (Eng. edn., 1921).



Adolf Hitler

Hitler, Adolf (b. 1889), leader of the German National Socialist Party, of Austrian birth, son of a minor customs official and worked as a house-painter. At the outbreak of the World War he was a draughtsman in an office

in Munich, enlisted in a Bavarian regiment, was wounded and gassed during the War, and in 1919 obtained a post as instructor in the Reichswehr. He met Gottfried Feder, who in 1919 formed the German Workers' National Socialist Party, and was the 7th member enrolled. In 1923, the unsuccessful Kapp *putsch* took place, and Hitler was subsequently sen-

tenced to some months in a fortress, during which time he wrote his confession of faith, *Mein Kampf*. From then the party moved swiftly. Large numbers from all classes rapidly joined his standard, rallying to the cry of "Germany, Awake!" Hitler's party obtained a larger number of votes than any other at the March elections in 1933, and he became Chancellor of the Reich.

The policy of the German Government, both internal and external, under his leadership caused considerable alarm and apprehension throughout Europe in his early months of power in 1933, and that alarm was even greater when, in the autumn of the year, Germany withdrew from the Disarmament Conference and announced her resignation from the League of Nations.

Hittites, a race of people formerly dwelling in Asia Minor, and mentioned in the Bible. Their history can be pieced together from Egyptian and Assyrian records and from monuments and other archaeological remains in Asia Minor. They appear to have belonged to a culture and a group of races widely distributed in Asia Minor in the 20th cent. B.C. The Hittites were a powerful people forming a State in Cappadocia in the 16th and 15th cents. B.C., and treated on terms of equality with Egypt and Babylon. They were in conflict with Egypt until the rise of Israel interposed a buffer State. Their empire spread over the great part of Syria, and its power was not weakened until the 9th cent. B.C. by the growing power of Assyria. Lydia became independent, and the Hittites were finally crushed by King Croesus of Lydia in the 6th cent.

Hive, see BEEKEEPING.

Hoare, Sir Samuel (b. 1880), British politician. He entered Parliament in 1910, having unsuccessfully contested Ipswich in 1906. After distinguished War service, he became Secretary of State for Air in 1922, again in Nov. 1924, and in 1927. He made the

first civil flight to India. He has been a member of the L.C.C. and served on many important parliamentary committees and commissions. On the formation of the National Government he became Secretary of State for India (1931). He succeeded to the baronetcy in 1915.

Hoar-frost, a deposit of ice crystals produced by the freezing of the water in the atmosphere as a result of cooling by radiation, evaporation or other causes. Since it condenses from the lower and more impure layers of the air, hoar frost abstracts impurities from the atmosphere and in this respect resembles dew. See also **Fog**.

Hoat, the pith of a species of *Sagurus* related to the sago palm, which is eaten by natives in the Pacific. It has the flavour of arrowroot. The fronds of the palm make thatch roof for the huts.

Hoatzin, a pheasant-like bird and probably related to the fowl and pheasant tribe but with many struc-

tural peculiarities. It has a crown of feathers and a long white-tipped tail, and lives in the forests of S. America, feeding on fruits and foliage and making a rough nest of twigs generally near or overhanging water. The young is remarkable for having two claws on each wing by means of which it can climb about the branches. The hoatzin has such an unpleasant odour that it is sometimes called the stink bird.

Hobart, the capital of Tasmania, is situated on the Derwent at the foot of Mount Wellington in the S. of the island. Chief industries: fruit-canning, brewing, tanning and timber products. It is a port of call for European and interstate steamers. Notable buildings: Government House, Parliament and the University. Pop. (1931) 58,100.

Hobbema, Meindert (1638-1709), Dutch painter, was born at Amsterdam where he worked with Ruysdael, painting land scenes of the surrounding



The Avenue Middelhaerdt by H. Hobbema 1662.

country He liked best to paint peaceful scenes with trees, houses, a church, or cattle, to give them incident His paintings are luminous, and have a fine feeling for colour and for space *The Avenue, Middelharnis*, which, together with other examples of his work, is in the National Gallery, is one of his finest pictures, and *The Mill* in the Louvre must also be mentioned Although he appears to have done no painting after he was 30, he produced nearly 200 pictures, and specimens of his work hang in all the principal collections of Europe

Hobbes, John Oliver, pen-name of Mrs Pearl Mary Craigie (1867-1906), American novelist Her works are notable for their wit and mysticism They include *The School for Saints* (1897), *Robert Orange* (1900), *Love and the Soul Hunters* (1902), and *The Herb Moon* (1896) Her most popular play was *The Ambassador* (1898)

Hobbes, Thomas (1588-1679), English philosopher, was educated at Magdalen Hall, Oxford, and upon graduating became tutor to William Cavendish, 2nd Earl of Devonshire, with whom he made a tour of Europe

His view that sovereignty was derived from the people, in that every man's natural right to rule was pooled in the person of the king, resulted in his being favoured by neither Cavalier nor Roundhead, and in 1640, when Laud and Strafford were sent to the Tower, Hobbes, being a naturally timid man, took no risks, and fled to Paris, where he stayed for 11 years During this period he wrote papers objecting to certain aspects of Descartes' system, with the result that correspondence between them ceased

His great work is *The Leviathan or the matter, form, and power of a common-wealth, ecclesiastical and civil*, in which he showed that the Church must be subordinate to the State He was banished from France for his attacks on the Papacy, and at the end of 1651 returned to England and made his submission to the Commonwealth After this many years were spent in

controversy, concerning not only politics and philosophy, but also mathematics, a science at which he was far from expert After the Restoration he became attached to Charles, who encouraged the philosopher and enjoyed his ready wit

In 1660 the House of Commons passed a Bill against atheism and profanity, in which Hobbes's *Leviathan* was mentioned as an example of a book containing "atheism, blasphemy, and profaneness" The elderly philosopher hastily burned his papers. He could never gain permission to print any works of an ethical nature, and was thus unable to defend himself against the attacks of his enemies But no Englishman of the period was so highly esteemed abroad, and all distinguished and learned foreigners who visited this country called upon him, the Grand Duke of Tuscany (Ferdinand II) even taking some of his works to adorn the Medici Library

Hobbes was a tall, erect figure, intellectually bold, in argument bad-tempered, and in ordinary life extremely timid and afraid of ghosts He made generous provision for his illegitimate daughter, and was fond of declaring that had he read as much as other men he would have known as little There is a fine portrait of him in the National Portrait Gallery

Hobbs, John Berry (b 1882), English cricketer Born at Cambridge, son of the groundsman at Jesus College, he early developed an aptitude for cricket, and has been for many years one of the greatest batsmen and cover-point fielders in the game He first played for Surrey in 1905, and was opening batsman in the Australian test matches from 1907 until 1928 He passed W G Grace's record of 54,896 runs in 1930, and in the middle of the 1933 season had scored 195 centuries in first-class cricket With Rhodes, he holds the record of 323 runs for an opening innings in a test match (1911)

Hobby, small falcon, like a diminutive peregrine It feeds principally on

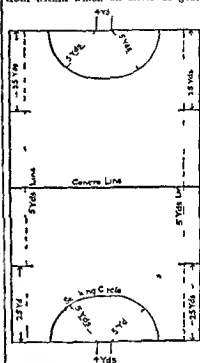
Insects and is a summer visitor to Great Britain

Hoboken (1) A town on the Scheldt Belgium c 3 m from Antwerp. The main industry is ship-building Pop c 30,000 (2) A town on the Hudson R New Jersey USA opposite New York to which it is connected by tunnels and ferries. Its docks are very important serving as an overflow for the New York docks. Its leading manufactures are silk and lead pencils. There is a school of mechanical engineering Pop (1930) 39,261

Hockey A game in which a ball was struck with a curved stick through an opponent's goal was played by the Romans and in many European countries during the Middle Ages. A primitive form of hockey is still played in Ireland under the name of hurley or hurling there is a similar game in Scotland known as shinty

Modern hockey dates from the formation of the *Modern Hockey Association* in 1873. Rules were drawn up by the Wimbledon Club in 1883. Hockey is now played between 2 teams of 11 a side the positions

being the same as in Association Football (see FOOTBALL). The ground is c 100 yds long and 50-60 yds wide. The goals are 7 ft high by 12 ft wide enclosed by a striking circle with a radius of 15 yards (see diagram) from within which all shots at goal



Plan of Hockey Ground

must be made. The ball is a cricket ball painted white; the sticks which have curved heads must not be more than 2 in in diameter or 38 oz in weight. The stick in play may not be lifted above the shoulder.

The game is started by a *bully off*. The ball is placed on the ground in the centre of the field between the 2 centre forwards who must each strike the ground and the other's stick



J. K. H. B.

alternately 3 times before attempting to play the ball. The ball may be stopped with the hand, foot, or any part of the body, but not held, picked up, thrown, or kicked, except by the goal-keeper within his own striking-circle. A ball sent into "touch" is returned to play by being rolled in by hand from the point where it crossed the line. If the ball is struck behind the goal-line by the attacking side, it is "bullied off" from the 25-yd line, if by the defending side from within the 25-yd line a "corner-hit" is awarded to the attackers. Any player is *offside* who is nearer the opponents' goal than the striker (this being a member of his own team), unless there are at least 2 opponents between him and their own goal.

International matches have been played between England and Wales since 1898, and England and Scotland since 1903. The first match between Oxford and Cambridge was played in 1890. Up till 1912 Oxford had won 15 matches and Cambridge 18.

Hockey is played by women as well as men, and women's international and county matches are contested regularly.

The game is usually controlled by 2 umpires, one for each half of the field.

Ice hockey was popular in the Netherlands in the 16th and 17th cents. It has long been played in England under the name of *Bandy*, but the modern form of the game originated in Canada, at the McGill University, Montreal, c 1880. The *Amateur Hockey Association of Canada* was formed in 1887, and a code of laws drawn up. The playing area, or "rink," should be not less than 112 x 58 yds; the goals are 4 ft high by 6 ft wide. *Sticks* must not be more than 3 in in diameter. Instead of the ball a flat disc of vulcanised rubber, called the "*puck*," is used, 1 in thick, and 3 in in diameter. The game is started by "facing" the puck on the ice between the sticks of 2 opposing forwards, each of whom tries to secure possession when the referee calls "play." Ice hockey is usually

played between teams of 7 aside for 2 periods of 20 or 30 minutes, with a 10-minute interval.

In the U.S.A. the game is controlled by the *Ice Hockey Association*. In both the U.S.A. and Canada the term "hockey" is generally applied to ice hockey, the ordinary form of the game being referred to as "field hockey."

Hocking, Joseph (b 1855), English novelist, became a Nonconformist minister in 1884, and travelled in the Near East. His numerous popular novels include *All Men are Liars* (1895), *Follow the Gleam* (1903), *The Scarlet Woman* (1909), *Prodigal Daughters* (1922), and *Out of the Depths* (1930).

Hocking, Silas Kitto (b 1850), English novelist, was ordained a Nonconformist minister in 1870. Among his numerous popular novels are *One in Charity* (1893), *The Heart of Man* (1895), *Gripped* (1902), *When He came to Himself* (1915), and *Watchers in the Dawn* (1920).

Hodler, Ferdinand (1853-1918), Swiss painter, born at Gutzwillen, Berne. He studied at Geneva, where he produced most of his work, but painted a considerable proportion of his pictures in Spain. He became well known in Switzerland and Germany as a portraitist and landscape painter.

Hódmezővásárhely, a town near Szeged, Hungary, situated in a fertile plain. Wheat crops are large and the green water melon and grape are also cultivated. An increasing amount of land is under tobacco. The district is famous for stock-raising. Pop. (1930) 60,342.

Hoe, a common tool made of an iron blade fixed crosswise to a wooden handle. It is used for breaking up and loosening earth and pulling up weeds, smoothing the soil, and covering up plants.

Hofer, Andreas (1767-1810), Tyrolean patriot. He was the leader of several revolts against the Bavarians, Austria having ceded the Tyrol to Bavaria by the Treaty of Pressburg (1805). After a period of submission

Hofmann made another bid for independence in 1809 but was captured and shot.

Hofmann, August Wilhelm von (1818-1897) German chemist. His first piece of chemical research carried out under the direction of Liebig (qv) was coal tar in which he showed the presence of aniline and quinoline (qv). He made experiments to determine what effect the substitution of halogens would have on the behaviour of organic substances and thus prepared chlor- and bromo-aniline and showed that the properties of these substances were similar to that of aniline itself.

In 1861 Hofmann became the President of the London Chemical Society. Experiments initiated by Hofmann with a view to the synthesis of quinine led his assistant Perkin (qv) to the discovery of the first aniline dye mauveine (qv) in 1856. This led Hofmann to the discovery of pararosaniline the parent substance of a number of important dyestuffs. In 1864 Hofmann returned to Germany and a year later was appointed Professor of Chemistry at the University of Berlin a post which he retained till his death. In 1868 he founded the Deutsche Chemische Gesellschaft on the model of the London Chemical Society and he was president of the former society till his death. Hofmann published a notable work in English namely *Introduction to Modern Chemistry* (1865).

Hofmann, Josef Casimir (b. 1871) one of the most famous and accomplished of musical infant prodigies. He has more than fulfilled the promise of his early years and is to-day one of the world's greatest pianists. He was a pupil of Rubinstein and toured Europe at the age of 9. Born at Cracow he now lives in America where he composes and teaches.

Hogarth, David George (1867-1917) English archaeologist. After conducting expeditions in Cyprus, Egypt and Crete he was sent in 1915 to

Cairo where he built up the war time Arab Bureau directing the activities of such workers as T. E. Lawrence and Gertrude Bell. He was President of the Royal Geographical Society (1915-17) and Keeper of the Ashmolean Museum (1909-17).

Hogarth, William (1697-1764) English painter and engraver. Hogarth's father was a schoolmaster from Westmorland. He was born in London and apprenticed to an engraver. In 1710 he set up in business for himself and engraved plates for booksellers and for other commercial purposes. He studied for a time at Sir James Thornhill's art school and subsequently in 1719 married the latter's daughter. Thornhill was furious and would have nothing to do with his son-in-law until the production of the *Harlot's Progress* convinced him of his genius and brought about a reconciliation. Soon after setting up his own business Hogarth began to produce original plates in which his satirical talents were at once evident. In 1718 he did the engravings for Butler's *Hudibras* and a year or so later began to paint what he termed his 'small conversation pieces'. These were portrait groups of figures on a small scale and brought him a certain amount of success but it was not until 1731 that his *Harlot's Progress* revealed the extent of his genius and won him widespread popularity. He engraved the plates from these paintings himself and the list of subscribers numbered more than 1,000.

In this series and in *The Rake's Progress* published in 1735 and now in the Soane Museum Hogarth developed the type of work of his 'Conversation pieces'. The pictures are small in scale and relate in telling fashion the sordid and tragic story of folly and vice. *Marriage à la Mode* is another similar series now in the National Gallery the engravings of which are dated 1745. Here Hogarth brings his satirical and merciless wit and his realism of treatment to bear on the private life of the English aristocracy.

Apart from these three series, which are probably the most famous and the most characteristic of his productions, Hogarth painted and engraved a large number of other works. His *Four Times of the Day*, *Strolling Actresses dressing in a Barn*, the *Distrest Poet*, and the *Luraga Musician*, and the *Industry and Idleness* series, are all masterpieces of ironic commentary.

If his large biblical paintings of the *Pool of Bethesda* and *The Good Samaritan* in St Bartholomew's Hospital are not altogether successful, the portrait of himself with his dog in the Tate Gallery, and that of the *Shrimp Girl* and his *Family Group* in the National Gallery show him as a painter well able to hold his own even outside that sphere in which he is second to none. His colouring is clean and fresh, his composition is thoroughly satisfying, and there is a vigour and directness in both his conception and his handling that have seldom been equalled by English painters. Regarded as commentaries on the ways and manners of his time his paintings and engravings are invaluable social documents, and both as artist and satirist his influence on his contemporaries and followers has been considerable.

Hogg, James (1770-1835), "the Ettrick Shepherd," Scots poet, a friend of Scott and Allan Cunningham. His first well-known volume was *Scottish Pastorals* (1801). *The Mountain Bard* (1807), *The Queen's Wake* (1813), *The Poetic Mirror* (parodies 1816), and the *Shepherd's Calendar* (1820) are collections of his verse. A self-educated man, his lyrics are remarkable for their feeling and beauty, and some closely approach those of Burns.

Hohenlinden, Battle of (French Revolutionary Wars) (Dec 3, 1800). 60,000 French under Moreau defeated an army of 70,000 Austrians under the Archduke John. The battle is celebrated by the poet Campbell.

Hohenlohe-Schillingfurst, Othlodwig Karl Viktor, Prince of (1819-1901), (*Prince Hohenlohe*), German statesman

and chief minister of Bavaria from 1866 to 1870. In 1874 he went to Paris as German Ambassador, was Governor of Alsace-Lorraine 1885-94, and in 1894 he was made Chancellor, resigning in 1900. His memoirs, *Denkwürdigkeiten*, were published in 1906.

Hohenzollern, House of: a German princely family founded by Count Thasso, who d 800. They ruled over Brandenburg from 1415, and from 1701 onwards furnished Kings of Prussia (German Emperors between 1871 and 1918). The last reigning member, Kaiser Wilhelm, fled from Germany in 1918 on the creation of the German Republic.

A Swabian branch was founded in 1251, and in the 16th cent was itself divided into the houses of Hechingen and Sigmaringen. One of the causes of the war with France in 1870 was the claim of Prince Leopold, of the Swabian line, to the Spanish throne. His son became King Ferdinand of Rumania.

Hokkaido, large island, forming the N part of Japan, together with the Kuriles and other small islands. The chief employments are fishing, paper manufacture, and timber cutting, the interior is particularly well-wooded. Sapporo is the capital, and the seat of a university, and Hakodate the most important port. Area, 38,215 sq m. pop c 2,000,000.

Hokusai Katsushika (1760-1849), Japanese artist. Hokusai was placed as a youth in the studio of Katsugawa Shunshō, an eminent artist of the time, but was expelled by his master for his revolutionary artistic tendencies. His colour-prints, which include innumerable views of Mount Fuji, a series of *Waterfalls* and one of *Bridges*, are considered to be among the finest productions of Japanese art. Skill of drawing, beauty of colour, a wonderful decorative sense, and exceptional powers of observation—these qualities have made his colour-prints admired and valued throughout the world.

Holbein [HO LNB] Hans (c 1400-1524) known as the elder German painter born at Augsburg. His brother Sigismund and his sons Ambrosius and Hans Holbein the younger were all painters. Holbein was influenced in his youth by the work of Roger van der Weyden but in his later period German and Italian influences displaced to some extent that of the Flemish school. In the altarpiece which he and his brother painted for the Dominican monastery at Frankfurt his own portrait is introduced with those of his two sons and his *Martyrdom of St Sebastian* in the Munich Pinakothek also contains portraits. Specimens of his painting exist in the Cathedral of Augsburg in the Museums of Frankfurt and Basle and elsewhere while stained glass that he designed is still visible in the Churches of Augsburg, Eichstätt and Straubing. His clear delicate colouring and sensitive drawing are two of his finest characteristics.

kneeling in the foreground was produced. It must have been almost immediately after completing this that Holbein came to England where he remained until 1528 making drawings and paintings of Sir Thomas More, Sir Henry and Lady Guildford and many more. Many of the drawings are in the collection at Windsor Castle. He returned to Basle but in 1530 was back in England and once more busily engaged on a series of wonderful portraits which included a family group of Henry VIII, *The Ambassadors* (1533) and *Christina of*



Georg Grosse by Holbein

De mark in the National Gallery, *Lady Jane Seymour* and *Sir Thomas More*. He was still painting similar masterpieces when he died of the plague in London at the early age of 46.

Holbein's portraits, whether drawn or painted, are masterpieces of characterisation. His draughtsmanship is even more sensitive than that of his father and has a quiet certainty that has seldom been equalled. His colour is skilfully handled whether it be in the sombre painting of *Christina of De mark* or the richness of the *Am-*

Holbein, Hans, the younger (1495-1543) German painter the son of Hans Holbein the elder was born at Augsburg and worked under his father until he went to Basle with his brother Ambrosius at the age of 18. Here he did drawings and decorations for books and produced the beautiful portraits of Jacob Meyer and his wife now in the Basle Museum already displaying the gift of portraiture which is such a remarkable feature of his work. His *Flagellation* and *The Last Supper* and the wall paintings in the Town Hall of Basle showed some traces of Italian influence. In 1511 he painted the *Dead Christ* and in the following year the fine *Virgin and Child between St Ursula and a bishop*. At the same period he was producing numerous drawings and engravings and designing window glass and it was at this time that he designed the famous series of woodcuts known as the *Dance of Death*.

A few years later the great altarpiece of the Virgin with the figures of burgomaster Meyer and his family

bassadors, and his arrangement is decorative and dignified. Every one of Holbein's works is finished with the greatest care, every detail minutely drawn and kept exactly in its proper relation to the whole. He made no experiments with *chiaroscuro* or impressionistic brush-work, but carried out his work with the conscientiousness of the great craftsman. His service to the development of portraiture in England can hardly be exaggerated, and he holds his own as a great artist, no matter with whom he is compared.

Holborn, the smallest of the London Metropolitan boroughs, covers an area of 405 acres. It is bounded on the



Elizabethan Houses (1586), Holborn

W by Westminster, N by St Pancras and Finsbury, and E by the City of London. It returns one member to Parliament. The borough contains the British Museum, the Royal College of Surgeons, Lincoln's Inn and Gray's Inn, the chapel of St Etheldreda, Ely Place, Freemasons' Hall, the ancient houses at Staple Inn, and several hospitals. It also contains the residential quarter of Bloomsbury, and the once-notorious district of Seven Dials. The borough has many squares and public gardens. Holborn Viaduct, carrying the roadway over the Hobsbourn stream (now underground) was erected in 1867-9 at a cost of £1,571,000. Pop (1931) 38,816, indicates a decline.

Holbrooke, Josef Charles (b. 1878),

British composer, was a chorister at St. Anne's, Soho, before his successful studentship at the Royal Academy of Music. His symphonic poem, *The Raven*, was first performed by Manns at the Crystal Palace in 1900. Of his operas *The Children of Don* was produced in London in 1911, *Dylan* in London in 1913, and *Bronwen* in Chicago in 1915. Besides other operas and choral works, he has composed concertos for pianos and violin and some striking chamber music.

Holden, Sir Isaac, Bart. (1807-1897), English inventor and manufacturer. Extremely poor, he began work at the age of 10, first with a weaver and then in a cotton mill, but attended night classes. He invented a wool-combing and a yarn-making process, which he patented with S. C. Lister, whose firm he later joined. On Lister's retirement in 1859, the concern became Isaac Holder & Sons, and the largest wool-combing business in the world. In 1805 he entered Parliament as a Liberal member for Knaresborough.

Holderlin, Johann Christian Friedrich (1770-1813), German poet, a friend of Schiller. In his works, the romantic fervour of the *Sturm und Drang* movement, his own melancholy leanings, and a deep love of Greek literature, are apparent. His writings include *Hyperion* (1797-9), a romance, his best-known work, and translations of Greek tragedies.

Holinshed, Raphael (1520?-1580?), English chronicler, wrote much of Wolfe's *Universal History*, to which William Harrison also contributed. Holinshed's great work, *The Chronicles of England, Scotland and Ireland*, appeared in 1578. Many dramatists of the time drew their plots from this history. Shakespeare used it for *Macbeth* and *King Lear*.

Holl, Frank (1845-1888), English painter, was born in London, his father, Francis Holl, being an A. R. A. He studied at the Royal Academy schools and was elected A. R. A. in 1878, becoming R. A. 5 years later. He is best known for his portraits, which include

Communications The most characteristic feature of internal communication is the great extent of the waterways. The country is linked up by a network of canals, the joint length of canals and rivers being some 4700 m., a length considerably in excess of the roads (c 3000 m). In 1931 there were 2280 m of railways operated by private companies. There are progressive air services linking up Holland with all parts of Europe and the Dutch possessions in the Far East.

Population The inhabitants of Holland are of Low German stock, speaking a language related to English. The largest towns were, in 1932, Amsterdam (766,300), Rotterdam (587,300), The Hague (449,600), Utrecht (156,200), Haarlem (122,400), and Groningen (107,200). Pop (1930) 8,061,600

Commerce and Production Holland has fallen from the commercial pre-eminence which she enjoyed during the 17th cent and is to-day largely an agricultural country, the trade of her great cities being to a great degree dependent on the transport of goods for the German markets. Nevertheless, she has to support an urban population amounting to nearly 50 per cent of the whole. In the absence of any great staple industries the country is dependent to a dangerous extent on the operations of financial and commercial middlemen.

Agriculture is skilfully conducted, and peasant proprietorship is widely established. The principal crops are oats, rye, wheat, barley, sugar-beet, and flax. Holland is poorly provided with minerals, although a little coal is mined in the province of Limburg. The chief industries are associated with dairying, the manufacture of butter, cheese, etc.; and others include distilling, sugar-refining, diamond-cutting, and brewing. There are nearly 3000 tobacco factories, and margarine is an important product. Dutch horticulture, especially the cultivation of bulbs, has long been famous. The

unit of currency is the gold florin (or guilder) = 1s 8d at par.

Government The latest revision of the Constitution was in 1922. executive power is vested in hereditary monarch, and legislative promulgated by the monarch jointly with the States-General or Parliament. The latter is composed of two chambers: the Upper of 50 members elected by the Provincial Estates; Lower, which consists of 100 deputies popularly elected. The Sovereign governs by the advice of a responsible ministry. The 11 provinces have their own local States or Parliaments. The political capital is at The Hague.

Religion. Full religious toleration exists. The majority of the inhabitants are members of the Dutch Reformed Church, as are the Royal Family. Roman Catholicism, however, has increased greatly. In Holland, once a headquarters of militant Protestantism, has now nearly two and a half million acknowledged adherents of the Roman Church.

Education. Primary education is compulsory and State-supported, a large scope is allowed to private institutions. Secondary and technical education is well developed. Four universities of Leyden, Utrecht, Groningen, and Amsterdam have been famous centres of learning since the early 17th cent.

Colonies. Dutch overseas possessions include the Dutch East Indies (733,300 sq m; pop 60,731,000) and the Dutch West Indies (52,700 sq m; pop 227,700). The Dutch East Indies comprise Sumatra, Java and Madura, Dutch Borneo, Celebes, Dutch New Guinea, the Moluccas, Banka, Billiton, Bali, Lombok, part of Timor, and many other islands in the Malay Archipelago. The Dutch West Indies are Dutch Guiana and Curaçao. See separate articles.

History The region now known as the kingdom of Holland had no separate political identity before the Union of Utrecht in 1579. Its early history cannot be dissociated from

general history of the Netherlands. Roman influence was only effective S and W of the Rhine. It was not until the conquest of Charlemagne that organised government arose in these regions. In the Middle Ages all the Netherlands except Flanders were included in the Holy Roman Empire. Almost the entire region including Flanders was acquired by the Dukes of Burgundy (qv) and passed by inheritance to Charles V, Holy Roman Emperor and King of Spain and the Indies (1506).

The initial antipathy to Spanish dominion was inspired chiefly by economic grievances. The Low Countries were the centre of a thriving city life which had already come into acute conflict with earlier overlords. The Spanish Government was expensive and oppressive and resented by the nobility and commercial classes. The Emperor too began to repress Protestantism which had captured the N districts (modern Holland) and was widely diffused among the population in Flanders. In 1555 Philip II succeeded to the Spanish kingdom but not to the Empire. He retained the Netherlands however and Spain thus became an obvious alien overlord. The persecution of the Protestants began in earnest and the Netherlands were soon in revolt. The Duke of Alba was dispatched to deal with it. His rule (1567-73) was marked by appalling brutality. The Netherlands fought desperately but the Spanish armies were too well trained for the burghal levies. In 1572 the Dutch privateers or sea beggars captured Brill becoming masters of the neighbouring seas and provided the revolt with an unassailable base. Alba was recalled in 1573 and his successor could not control the rebellion. The relief of Leyden marked the decisive epoch in the land warfare and from that time onwards the tide was with the Netherlands although the issue was long doubtful.

A cleavage between the Catholic S provinces (Artois, Flanders, Bra-

bant etc.) and the Calvinist Dutch had been growing for some time. The sack of Antwerp produced a temporary reconciliation (Pacification of Ghent 1576) but in 1579 the Catholic element formed the separate League of Arras. The V provinces replied by the Union of Utrecht and in 1581 the States General (Federal Parliament) formally repudiated the Spanish authority. Under the leadership of William and Maurice of Orange the struggle against Spain was continued. England after 1585 lent assistance which was none too efficient but the rout of the Armada weakened Spanish offensive power. In 1609 a twelve years truce was concluded and on the renewal of the war in 1611 the Dutch exploited their now ascendant sea power to neutralise the genius of Spinola and the still efficient Spanish infantry. In 1639 the Spanish fleet was beaten in the Downs and the Dutch led by Frederick William of Orange were successful on land. France lent her support after 1635 and by the Treaty of Westphalia 1648 the United Provinces of the Netherlands were formally recognised as an independent sovereign State.

The 17th cent was the golden age of Dutch greatness. Inspired by the epic struggle the artists and thinkers of the young State attained an eminence never since equalled by their countrymen. The great painters Rembrandt and Van Dyck, the jurist Grotius and the patriot Oldenbarnevelt are the greatest names of the time. Dutch colonisation expanded rapidly at the same time. The power of England however was expanding as rapidly in a similar direction and in the inevitable struggle for maritime supremacy which followed the Dutch struck many shrewd blows but without permanent result. Cromwell was successful in the 1st Dutch War (qv) and but for the utter corruption of Charles II's government the 2nd would have had the same result as it was the struggle left England with her

resources unimpaired, whilst Holland felt the strain severely.

Since the Twelve Years' Truce a constitutional struggle had been in progress. The United Provinces as originally constituted formed a federal republic, in which the most influential members were the two aristocratic provinces of Holland and Zeeland. The Orange family represented the principle of centralisation and, ultimately, of monarchy. Holland clung to the federal principle, and Maurice of Orange was partially responsible for the murder of her leading statesman Oldenbarnevelt (1618). After this summary act, the Orange dynasty were predominant until the minority of William III afforded another opportunity for aristocratic separatism, when the De Witts secured control, ruling on republican lines. The disasters consequent upon the French attack in 1672 led to their assassination by an angry mob. William then became Stadtholder with the virtual powers of an absolute monarch. The French attack arose out of the "Devolution" claims of Louis XIV upon the Spanish Netherlands, and it had important results. The arrogance of the Grand Monarch awakened the enduring resentment of William and the Dutch. In 1688 William became King of England, and from that time Anglo-Dutch hostility was the core of resistance to Bourbon pretensions.

Holland, like Sweden, had not the resources in men and productive capacity to sustain her 17th-century political advance. She was exhausted by her struggles with England and France so that throughout the 18th century the Republic was in decline and little more than a satellite of the Great Powers. The French revolutionaries overran the country in 1794-5, and reorganised it as a democratic Batavian Republic. In 1806 Holland became a Bonapartist kingdom and was incorporated in the Napoleonic Empire in 1810. The association with France cost Holland many of her colonial possessions (Cape of Good

Hope, Ceylon, etc.) in the war with Great Britain, till in 1813 there was a general rising of the Netherlands against Napoleon. Two years later William V of Orange became King of the Netherlands. A Belgian revolution in 1830 led to the secession of that country, and the kingdom of the Netherlands has since that date corresponded to the territories of the Republic of the United Provinces.

Since 1830 Holland has pursued the path of peaceful reform. The country has not been involved in any great European war, the constitution was revised in a liberal sense in 1848, and at the close of the 19th century there was a marked revival in prosperity and culture. Holland maintained her neutrality in the World War with wisdom and firmness, in 1917 universal suffrage was introduced, and, at present, in spite of the repercussions of the trade depression, and occasional outbreaks in the colonies, the country is potentially a healthy democratic State.

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Holland: (1) Maritime district of the kingdom of the Netherlands, divided into the provinces of N and S Holland. It is the most populous area in the kingdom. The chief towns are Amsterdam, Rotterdam, and Haarlem. Area, 2190 sq. m.; pop. (1931) 3,527,500. (2) Or *Parts of Holland*, a subdivision of the county of Lincolnshire, England.

Holland, Henry Fox, 1st Baron (1705-1774), British statesman. M.P. 1738-63, he was Lord of the Treasury in 1743, was Secretary-at-War from 1746 to 1755, and in that year was made Secretary of State. In 1757 he took over the duties of Paymaster to the Forces, and his rapidly acquired wealth leading to allegations of dishonesty, he was compelled to resign the post in 1765. Created baron, 1763.

Holland, Henry Scott (1847-1918) Church of England clergyman. Canon of Truro in 188. Canon of St Paul's 1884 and of Christ Church 1910 when he also became Regius Professor of Divinity at Oxford. He was one of the leading theologians of his day and was associated with the Christian Social Union. Holland edited the *Compass of Wealth* and was the author of a number of works including *Fibres of Faith* (1910) *Vital Values* (1906) and *Personal Studies* (1905).

Hollander see PAPER MAKING

Hollar Wenzel (Wenceslaus) (1607-1677) Bohemian etcher and engraver born at Prague and worked in different towns in Germany before coming to England in 1637. His numerous plates of views of London are well known and greatly admired. He also engraved illustrations for Ogilby's *Virgil* and *Homor* Stapylton's *Juvenal* Ogilby's *Africa* and other books. Although he received the patronage of the Earl of Arundel and later of the Duke of York his life was spent in poverty. Both the British Museum and Windsor Castle contain fine collections of his plates.

Holles Denzil Holles 1st Baron (1599-1680) English statesman famed for holding the Speaker of the House of Commons in his chair to prevent him from adjourning after he had refused to read Eliot's Protestations (1629). For this Holles was imprisoned but was soon back in Parliament where he supported the Grand Remonstrance and was one of the five impeached members. He fought in the Civil War at Edgehill and took part in peace negotiations with the King. After the Restoration he was created Baron Holles went to France as Ambassador (1663) and became a Privy Councillor (1679).

Holly an evergreen tree or shrub with glossy spinous leaves small white or greenish flowers and red or yellow poisonous berries. It is a wild inhabitant of England and its boughs are used for decorations at

Christmas The wood is white and close grained and used by cabinet makers for inlaying.



Holly

Hollyhock, a hardy perennial belonging to the mallow family first introduced from China. It grows to 8 feet bears large palmate leaves on long stalks and small axillary shoots on which the flowers arise. The single or double flowers are pink rose or dark purple. The plants should be set in April and plentifully watered and given liquid manure from May till the flowers open.

Hollywood, district in California U.S.A. forming part of the city of Los Angeles (q.v.). It is the headquarters of the American film industry.

Holmes, Sir Charles John (b. 1868) British artist and critic educated at Eton and Oxford and from 1904 to 1910 was Slade Professor of Fine Art at that University. Was Director Keeper and Secretary of the National Portrait Gallery in 1909 and was Director of the National Gallery from 1916 to 1924. He is represented by works in the Tate Gallery British Museum the Victoria and Albert Museum and elsewhere. Is the writer of various critical works on art notably in regard to the work and influence of Constable. Member of

the New English Art Club, 1904 He was knighted in 1928

Holmes, Oliver Wendell (1809-1894), American author, collaborated with J. R. Lowell in the *Atlantic Monthly* (1857). In this journal, his famous humorous essays appeared under the titles *The Autocrat of the Breakfast Table* (1858), *The Professor* (1860), and (1872) *The Poet, at the Breakfast Table*. His other writings include verse and novels, which have the same qualities of charm and wit as his essays.

Holst, Gustav (b 1874), English composer of Swedish descent, born at Cheltenham. After studying at the Royal College of Music, he taught music in various colleges after playing in an orchestra on completing his studies, later became a teacher at the Royal College. His most important works are his symphonic cycle, *The Planets* (1919), his opera, *The Perfect Fool*, first produced by the British National Opera Company at Covent Garden in 1923, the opera *Savitri*, the *Hymn of Jesus* (1917), and his choral symphony (1923). Besides these, he has written many part songs and some lighter instrumental works. Though his striking and powerful *The Planets* shows him to be a more than competent orchestrator, it is in his choral writing that his finest and most distinctive qualities are found.

Holster, a case of leather, fastened to a horse's saddle-bow or to a belt as pistol container.

Holy Alliance, a document signed in 1815 by various European monarchs affirming the importance of Christian principles in political affairs. Though never effective in reality and frequently confused with the Quadruple Alliance (*qv*), which was for a time an embryonic instrument for international government, its importance lies in the moral sanction it seemed to give to the rulers of Europe for interference in revolutions in neighbouring States. After the break-up of the Quadruple Alliance in 1825, the term was loosely

used to refer to such action as that taken by Nicholas I Tsar of Russia, in suppressing the Hungarian revolution on behalf of the Emperor of Austria. But later still it inspired Nicholas II to invite the nations of the world to the Peace Conference held at The Hague in 1890 (see HAGUE CONFERENCE, THE).

Holy Communion, see COMMUNION, HOLY.

Holy Ghost, The, in Christian theology the third Person of the divine Trinity, who proceeds from the Father and the Son (but see article FILIOQUI CLAUSE). He is also called the Holy Spirit, the Comforter, the Paraclete (Gr "advocate"). The doctrine concerning Him is based on Christ's promises to His disciples that after His death a Comforter would be sent to them. He is referred to frequently in the New Testament, especially in connection with Christ's baptism. He is considered as a personification of the bond of reciprocal love uniting the Father and the Son. He is generally symbolised in Christian art by a dove.

The divinity of the Holy Ghost was defined by the Council of Constantinople (*qv*) in 381, when the heresy of Macedonius, who subordinated Him to the Father and the Son, was finally condemned. The "Seven Gifts" of the Holy Ghost (Isa xi 2) are wisdom, understanding, counsel, fortitude, knowledge, piety, and the fear of the Lord. His special feast in the Christian Church is Pentecost (*qv*) or Whitsunday, which commemorates His descent on the Apostles after the Ascension of Christ. See also TRINITY, CONFIRMATION.

Holy Grail, see GRAIL.

Holy Island (or *Lindisfarne*), an island summer resort off the coast of Northumberland, connected at low tide with the mainland. There are ruins of an abbey and a castle. Fishing is the main occupation. Area, c 2 sq m., pop c 450. St. Aidan (d 651), missionary from Iona and first bishop of Lindisfarne, made the island centre of Christianity.

Holyoake George Jacob (181 -1906) English agitator and advocate of co-operation. He was convicted of blasphemy in 1841 and served 6 months imprisonment. He published works on the co-operative movement and his memoirs.

Holy Orders the rite or in Roman Catholic and Eastern Orthodox theology the Sacrament by which men are set apart for the exercise of spiritual and ministerial functions in the Christian Church. The Anglican Church recognises three orders those of bishop priest and deacon the Catholic and Orthodox Churches seven three major orders—priest deacon and subdeacon and four minor—acolyte reader exorcist and door keeper. The four minor orders do not impose an obligation of celibacy but in modern practice they are in variously steps on the road to priesthood. The duties of the acolyte are generally carried out in the Western Church to-day by laymen. A movement in the Anglican Church in recent years for the admission of women to ordination has not received wide support.

Holy Roman Empire. The The Dark Ages (qv) never lost the traditions of Rome and the memory of Roman law and order. But it was to the later Roman Empire under Constantine not to the earlier under Augustus and his successors that they looked for their ideal. The empire of the r dreams was religious not in the sense of the Augustan Empire with the Caesar as deity but with the Emperor as defender of the Christian Faith. This curious mixture of Roman tradition but dully understood of Christian ethics and personal ambition known as the Holy Roman Empire was in theory the secular arm of the Papacy. It stood for the world government of Christendom in the same way as the Papacy stood for its spiritual government and naturally enough they quarrelled. The history of Medieval Europe is overshadowed by the struggles of these

two international institutions. The result was the defeat of the Empire and its survival as an empty title of honour privately owned by the Habsburgs. This rivalry weakened the Papacy helped to destroy the ideals on which both the Empire and the Papacy were built and was the fundamental cause of centuries of German disunity.

In the Empire of Charlemagne the thinkers of the age imagined they saw the realisation of that dream of world unity derived from Rome. Charlemagne had defeated the Saracens and checked their invasion of Europe and had aided the Papacy against the Lombards. For reward he was crowned Emperor by the Pope in A.D. 800. This empire was short lived. It evoked little enthusiasm amongst the powerful outside the Church. The problem of administering a large empire could only be solved by local autonomy which made rebellion a much easier matter than in the days of Rome.

It is not to Charlemagne's empire but to the empire of Otto the Great of Saxony that the name Holy Roman Empire is given. His great achievement in Germany was the extension of the German frontier to the E. and the defeat of the Slavs and Hungarians. In 962 Otto entered Italy to receive the crown of Italy and the Holy Roman Empire. This empire was smaller than that of Charlemagne as it did not include what is now France. Yet even so it was large and unwieldy. That the Emperors unlike the Kings of France and Italy were unable to consolidate their power and make Germany a nation, may have been due to the inclusion of Italy in the Holy Roman Empire. This involved the Emperors in a policy which brought them into conflict at one time or another with the Papacy and the Italian cities and distracted their attention from the internal affairs of Germany. Otto I for example spent 10 of the 12 years of his reign outside Germany.

His grandson Otto III lived mainly in Italy, calling himself a Roman and living in Rome. The glamour of Rome and an Italian policy had already cast over the Emperors the spell which was to lead to the downfall of the Empire and delay the unification of Germany, until there arose a man—Bismarck—to whom territory meant little and German unity much.

The early Emperors were masters both in Germany and Italy. The Papacy as a State was under the suzerainty of the Emperor, and the Pope's election needed Imperial confirmation before it was valid. Under Henry III (1039-56), the Empire was at the peak of its power. Hungary, Bohemia and Poland became vassal States. Henry III retained power over the Papacy, and in fact appointed and deposed Popes. But the seeds of the struggles that were to come had already been sown. The Cluniacs, a religious order, had been working steadily for the reform of Church organisation and its freedom from secular interference. The power of the Papacy was developing, and it is the irony of history that this increase in power, that was to lead to the defeat of the Empire, was in its early days materially assisted by the Emperors.

The two centuries that followed the death of the Emperor Henry III are filled with the struggle between Empire and Papacy, a struggle which had its repercussions on the whole of Mediaeval European history. The period falls roughly into three phases: the 1st from 1016 to the Concordat of Worms (1122), the 2nd the period of Frederick Barbarossa and Henry VI (1122-98), the 3rd the period of decline (1199-c. 1273). In the first period the Papacy claimed complete superiority over all secular powers, including the Holy Roman Empire. The famous Pope Gregory VII (Hildebrand) was determined to free the Church from all vestige of lay control. In 1075 he laid down the claim that the election and institution of clerics must be free from all interference

from temporal powers. This led to the famous Investiture Struggle. Henry IV insisted on investing by means of the spiritual symbols of staff and ring. Henry was excommunicated by the Pope, who encouraged Henry's German subjects to rebel. In 1077 Henry crossed the Alps, and did penance at Canossa in order to obtain pardon. In 1080 he was formally deposed by the Papacy, and although in 1085 he invaded Italy and drove Hildebrand out of Rome, his deposition resulted in the forming of an opposition party in Germany, and the beginnings of German particularism. In 1122 Henry V came to terms with the Pope and the Concordat of Worms settled the religious quarrel. The spiritual symbols were to be used by spiritual authority only, and ecclesiastical lords were to do homage to their feudal lords in return for their temporal possessions.

In 1152 the election of Frederick as emperor placed the Hohenstaufen family on the Imperial throne. Frederick Barbarossa (red-beard) was eminently successful in his German policy but, like his predecessors, was drawn into interfering with Italy, which involved him in conflict with the Papacy and with the Lombard cities. Unfortunately for German unity, Frederick gave many privileges to the feudal lords in Germany, in order to gain support for his expeditions into Italy. His opponents in Italy, the Papacy and the Lombard League, an association of N. Italian towns, made common cause against Frederick. At the battle of Legnano (1176) he was defeated, and Europe again saw an Emperor making submission to a Pope. Before his death Barbarossa married his son Henry to Constance, heiress of the Kingdom of Sicily and Sicily, thus bringing the Holy Roman Empire into touch with the Mediterranean, and making an Italian policy more of a necessity than ever. Frederick Barbarossa's reign had important consequences for Europe. By concessions to the feudal

ties in Germany disunity and particularism were considerably strengthened while the marriage of Henry VI to Constance led to his gamble for a wider Empire an enterprize which failed miserably.

Henry VI (1180-8) aimed at making his Empire hereditary instead of elective and dreamed of extending it to include the Eastern Empire as well as the Holy Roman Empire. So strong was the dream of a united world a new Roman Empire in those days that enthusiasm was awakened and Henry was successful enough to force the Eastern Emperor to do him homage. He died in 1198 before his schemes could materialise. Probably they would have broken on the point of the Papacy which had greater popular support and wider power than the Holy Roman Empire faced as was the latter with dissensions in Germany opposition in Italy and rebellion in the new territory of Sicily. Henry died and left a young son in the wardship of the Pope.

Then followed the decline of the Holy Roman Empire. In 1258 Pope Innocent III gave the Empire to Otto IV a member of the Guelph family rivals to the Hohenstaufen. In 1274 Otto proving to be less the tool of the Papacy than the Pope had wished the Empire was offered to Frederick II son of Henry VI. Again the Empire came into conflict with the Papacy and again was defeated. The princes and bishops of Germany forced further privileges out of Frederick II in return for their aid. After 1258 no Emperor was actually recognised as such for 17 years the Holy Roman Empire had no Emperor and when revived in 1273 it no longer included Italy.

The remainder of the story of the Holy Roman Empire is closely connected with that of the Habsburgs. The Emperors took second place and their personal possessions and the quarrels and wars waged over them became most important. The Holy Roman Empire with its two great

divisions Germany and Italy and with its German Emperors pursuing necessarily a policy of dominating Italy hindered the unity of Germany. Emperors had to give their privileges and rights of jurisdiction to the German princes lay and ecclesiastical in order to obtain aid in their Italian expeditions. Unfortunately for Imperial aspirations in Italy there was another international power the Papacy. Drawing on all Christendom for its resources moral and material it was able to resist the Empire and finally to defeat it. But as in most such prolonged struggles the victor also was considerably weakened and the weakness of the Papacy made the path to power of the rising nation States such as England and France all the easier. German disunity in particular and European disunity in general were the results of the inevitable conflict between the two international powers. The dream of Roman unity on which the Holy Roman Empire was based could not have been achieved while this conflict of spiritual with temporal power remained unresolved. The old Roman tradition was that religion should be the handmaid of the States. The Papal claim was that the State should serve religion.

The history of the Holy Roman Empire in the period following the Great Interregnum (1258-73) in so far as it is not the story of the fortunes of the House of Habsburg continues the main influences of the earlier period. It is true that the Emperors were no longer distracted by Italian arms from putting their German house in order but as possessors of great territories outside the narrowed confines of the Empire they were involved in a series of dynastic wars. The Reformation also increased the power of particularism in Germany.

The three families of Habsburg Wittelsbach and Luxemburg were rivals for the Imperial dignity in the early years after the Interregnum. Disputes over electoral rights divided

the Empire, and were settled by the Golden Bull of the Emperor Charles IV in 1356. This increased the power of the electors, and drove another nail into the coffin of German unity. Attempts, such as that of the Emperor Maximilian, to re-establish some of the power of the Holy Roman Empire broke down in face of the smaller nobility of the Empire, who were not represented in the Diet (which consisted of electors, princes, and cities). The Reformation split Germany into two, and only in the Catholic S was the Habsburg Emperor henceforth to receive the respect due to his dignity. In spite of Charles V's attempt to impose Catholicism on Germany, the individual States were given, by the Peace of Augsburg, 1555, the right to decide for themselves the religion of their subjects. The Peace of Westphalia, 1648, which ended the religious wars of Germany, separated some of the frontier provinces from the Empire, Lorraine and part of Alsace, for example. Most of the Emperors were concerned more with their own private possessions than with the welfare of the Holy Roman Empire. The ideal had been lost, and in any case changed conditions had made its realisation even more impossible than it had been in the Middle Ages. Strong nation States such as England and France and the new rising State of Prussia, pursuing the policy of the Balance of Power (*q v*), were greater obstacles to Imperialist ambition. From the 17th cent to the extinction of the title in 1806 the Holy Roman Empire was, as Voltaire remarked, neither holy nor Roman nor an empire. It was an empty title bringing with it neither power nor loyalty, only its pomp and ceremony, its Diet and Aulic Council—the ghosts of a power which had perished a long time since. The dream of world unity had died. The memory of Rome was no longer that of a Golden Age viewed from the comparative anarchy of the Dark Ages. German unity was to emerge from "blood and iron," and that same spirit of nationalism which

under Napoleon swept away the last traces of mediæval internationalism.

See H W C Davis: *Mediæval Europe*, Jacobs, *The Holy Roman Empire*, Bryce, *The Holy Roman Empire*, in some respects superseded by later work, but still the most complete popular account.

Holy Spirit, see HOLY GHOST

Holy Water, water containing a little salt, blessed by priests in the Roman Catholic Church, and used for various liturgical purposes. A quantity of holy water is usually placed in a vessel at the church door, into which worshippers dip their fingers on entry, subsequently making the sign of the Cross.

Holy Week, in the Christian Church, the week before Easter Day, beginning on Palm Sunday.

Holywell, a market town on the Dee, Flintshire, Wales. In the neighbourhood are zinc mines and cement works, and in the town the manufacture of hardware is carried on. St Winifred's Well is believed to possess curative qualities. Pop (1931) 3423.

Homage, in feudal times a ceremony in which a vassal signified his submission to his lord by laying aside his weapons and accoutrements, and swearing an oath of absolute allegiance.

Home Office, a department of State created in 1782 and entrusted with multifarious duties in connection with home affairs. At its head is the Home Secretary, who is the channel of communication between King and Subject, petitions to the King go through him, and he advises the Crown as to the exercise of the prerogative of mercy. He controls all prisons, reformatories, industrial schools, the Metropolitan police, and to a certain extent provincial police forces, appoints Recorders and Stipendiary Magistrates, administers the Aliens Act, and has the power to grant certificates of naturalisation. In short, the Home Secretary is responsible for the good order, security, and general well-being of the community.

Homer, traditionally the greatest

Greek epic poet author of the *Iliad* and *Odyssey*. Nothing is definitely known of Homer. Internal evidence of the poems shows that he lived before the 11th cent B.C. and tradition has it he was a blind minstrel but scholars have not yet decided whether the poems are the work of one man of several men or of collaborators. Whether indeed the *Iliad* and *Odyssey* were composed in their entirety or whether they are series of ancient lays put together centuries after their composition is another question that remains unsolved. The problems involved in these and other doubts about Homer are considered by Andrew Lang in *Homer and his Age* (1907) and in

Introduction to Homer by Jebb. It is sufficient here to say that the poems are the first and finest classic epics. Their beauty of thought and language and Homeric

was the subject of Bills introduced by Gladstone in 1898 and 1893 the latter just obtaining a majority in the House of Commons but being rejected in the House of Lords. Shortly afterwards the Liberals went out of office and were not returned again until 1906 at which election they pledged themselves not to introduce a Home Rule Bill. At the election fought on the Parliament Act issue however they made no pledge about Home Rule and Asquith introduced his Home Rule Bill in April 1912. It passed the House of Commons but was rejected by the House of Lords whereupon it was passed in three successive sessions of the Commons and became law under the provision of the Parliament Act irrespective of its rejection by the Lords. The Bill set up a legislature and executive in Ireland to administer Irish affairs subject to the Imperial Parliament but provided that the expense should in the main be borne by the Irish. It included Ulster and almost led to a rebellion in that direction the resistance being supported by F. E. Smith (Lord Birkenhead) and Sir Edward (later Lord) Carson. The Lords still held out on the Ulster question but on the outbreak of the World War the Bill became law for the whole of Ireland. The postponement of its operation until after the War however and the establishment of the Irish Free State led to its never becoming operative.

Homicide the killing of a human being by an act or as by neglecting to feed a child by an omission. Homicide may be lawful e.g. the execution of a criminal condemned to death death occurring in an attempt to maintain the peace quell a riot etc. the killing of another in defence of oneself or one's family or property provided the force used is reasonably commensurate with the injury offered and the case is one of extreme necessity thus a person attacked must retreat as far as he can before doing anything that may lead to the death of the assailant. Misadventure is also an excuse



Homer

powers of description and characterization remain unsurpassed. The *Batrachomyomachia* is also ascribed to Homer is the first example of the mock heroic epic.

Homeric Poems, name given to the *Iliad* and *Odyssey* of Homer (qv) and other Greek poems of the same cycle (see CYCLIC POEMS) which have been lost. The term is also applied to the extant *Homeric Hymns* and the *Batrachomyomachia* (*Battle of the Frogs and Mice*).

Home Rule, term applied to self government by a colony province etc. and especially in English politics in relation to Ireland. The Irish request for Home Rule became a definite policy in 1871 and in 1885 Ireland returned a large majority in its favour. It received the support of the Liberal Party and

provided the defendant was doing a lawful act with no intention of causing harm and not in a criminally negligent manner, thus, to kill in a prize-fight is a crime, for a prize-fight is an unlawful act, and even a lawful game may become unlawful if so conducted as to be made the occasion for intentional injuries inflicted in anger. Where some shipwrecked sailors cast away with neither food nor drink, and no hope of being saved, killed and ate one of their number, on being rescued they were indicted and convicted of murder. But to save another's life at the expense of a third person may be justifiable, e.g. at a childbirth where it becomes necessary to sacrifice the mother or the child in order to save the other. Consent of the person killed has often been raised as a defence in a case of homicide, but it will not justify the defendant in committing an act obviously dangerous to life. If in a duel one person kills another, he cannot excuse himself on the ground that the other consented to take the risk and even challenged him to fight. Since a human being is not a legal person until after birth is complete, it is not homicide but abortion to kill a child in the womb. For unlawful homicide see MURDER, MANSLAUGHTER, INFANTICIDE, SUICIDE.

Homily, originally a more simple exposition of Christian doctrine than that which would be given in a sermon, it came to denote a discourse of some more famous theologian or ecclesiastic read out for the benefit of the congregation, instead of a sermon composed by the officiating clergyman. Popularly, a brief statement of precept.

Homocyclic Compounds, or carbocyclic compounds, organic substances which have a ring structure composed exclusively of carbon within the ring itself, although numerous other elements may be attached to the carbon atoms. The typical homocyclic compound is benzene (*q.v.*)

Homœopathy, a system whereby drugs are prescribed for illnesses after

a special study of their action on healthy persons. The method is largely due to Samuel Hahnemann (1755-1843), who was struck with the idea of testing medicines on himself. The first medicine he tried was cinchona bark, a cure for fever, and he found that it produced fever in him; hence he argued that the curative power of the bark was achieved by the production of a fever similar to that which it was desired to combat. He also perceived that persons in ill-health were more susceptible to the drug than normal individuals, and that the doses had to be reduced. By evolving a system of dilution he was able to use preparations of many poisons. He was also the first to suggest the use of virus of a disease as a cure, and thus was indirectly responsible for the modern vaccination and serum treatment. The principal institution practising homœopathy in England is the London Homœopathic Hospital, but there are many institutions on the Continent, in America, and elsewhere that use this method.

Homologues, in organic chemistry, compounds of similar chemical and physical properties, which differ by a constant group. A simple example of homologous series is the paraffins, CH_4 , C_2H_6 , C_3H_8 , C_4H_{10} , etc., which are all very similar in behaviour, and differ from one another by the addition of CH_2 to each member. Similarly, the alcohols CH_3OH , $\text{C}_2\text{H}_5\text{OH}$, $\text{C}_3\text{H}_7\text{OH}$, etc., again differ by CH_2 . Numerous examples of such gradations occur in organic chemistry. The term is also applied sometimes to elements of a similar class whose variations in chemical and physical behaviour increase in a more or less regular manner, as, for instance, in the halogen series, fluorine, chlorine, bromine, iodine.

Homology (biol.), similarity of structure, due to a common origin. Superficially there may be no resemblance between homologous organs, and their functions may differ. The essential structure of the skeleton of a

human arm and the wing of a bird are similar although the latter enables flight while the former does not. The arm and wing are homologous and have been inherited from a common ancestor. The phyllodes of butcher's broom (*Ruscus aculeatus*) are structures superficially resembling leaves but are homologous with stems since they originate in the same way and bear leaves and flowers. See also ANALOGY. ANATOMY AND EXTERNAL MORPHOLOGY.

Homonyms [hómónímz] words which are either spelt or sounded alike but are different in meaning e.g. *beat* and *beet* *sow* [sow] and *sow* [sô].

Homs, a town near the R. Orontes N. Syria and important station on the trade route from Damascus to Aleppo. Its manufactures are textiles silk and gold and silver threadwork. Pop. 52 800.

Honan, one of the 18 provinces of China situated between the Hwang Ho and the Yangtze. Kuang Chin Kuang is the capital. The district is well drained and the soil fertile its chief crop being cotton with useful subsidaries in cereals and hemp. Coal is mined. Area 67 900 sq. m. pop. (estd.) 35 90 000.

Hondecoeter (HONDEKOO TEA) Melchior d. (1636 1695) Dutch painter famous chiefly for his paintings of birds. Specimens of his work hang in the National Gallery in Glasgow and Liverpool as well as in most of the continental art galleries.

Honduras, a Central American Republic bounded by Guatemala on the W. Nicaragua the Pacific Ocean and Salvador on the S. and the Caribbean Sea on the N. and E. The coasts are low and swampy but the interior is mountainous rising in terraces to the lofty tableland of the Central American cordillera. The highest point is the Montaña de Salaque (10 100 ft). There are several large rivers of which the Ulua and Segovia are the chief they are navigable for light craft for a considerable distance. Area 44 270 sq. m.

The highlands are healthy and invigorating but the coastal strip is very enervating. Agriculture is the staple industry. Bananas and coconuts are grown in great quantity on the Atlantic coasts. Coffee thrives in the higher valleys. Tobacco chiefly for cigars sugar and mahogany grow well. Mineral resources (gold silver coal iron zinc copper and lead) are very rich but so far they have barely been touched. Ranching is being encouraged. Over 75 per cent of the trade of the Republic is with the U.S.A. The standard coin is the gold lempira worth c. 1/5 1d at par.

The bulk of the inhabitants are Spanish speaking half castes of mixed Indian and Spanish ancestry. There are still over 30 000 of the aboriginal Indians and some of the tribes occupy territory which has not yet been fully explored. Negroes are employed in large numbers on the N. coast in the fruit trade. The largest towns are Tegucigalpa the capital (40 000) La Esperanza (11 400) and Santa Rosa (10 600). Total pop. (1930) 859 800.

Government Religion and Education. The constitution of the Republic revised in 1914 provides for democratic government. The President is elected for 4 years by plebiscite and appoints the ministerial council which controls the administration. The legislature comprises a chamber of deputies of 43 members elected for 4 years from equal population areas. Roman Catholicism is the prevailing religion but toleration is safeguarded. Elementary education is free and compulsory there are secondary and technical schools and a National university at Tegucigalpa.

There are c. 2150 m. of railway almost entirely operated by the foreign fruit companies. Roads are being improved but are still few and poor and off the 360 m. of motor road transport is usually by mule-pack or ox-cart. An air service operates from the chief towns. Telegraph and telephone services are well developed. There are 6 wireless stations.

History Columbus took formal possession of Honduras on behalf of the Spanish Monarchy in 1502. Gold discoveries attracted immigrants, and in 1539 the colony was placed under the control of the Captain-General of Guatemala. In 1821 Honduras was declared independent, and a republican government was set up under charter of 1824. The U.S.A. intervened to restore order during revolutions in 1922-4. See also **BRITISH HONDURAS**.

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Honduras, British, see **BRITISH HONDURAS**.

Honegger, Arthur (b. 1892), French composer. He studied at the Paris Conservatoire, and was a member of the early group of young modernists known as "The Six." His outstanding works are *Pacific 231* and his oratorio, *King David* (1922). He also composed the opera, *Judith* (1924).

Honesty, coarse-leaved plant belonging to the Cruciferae, 2-3 ft. high, with purple flowers like those of wall-flower, and flattened, circular seed pods which lose their outer covering and appear white and shining. The plants may be grown from seed sown out of doors in April.

Honey, a viscous substance produced by various kinds of bees as food for their larvæ, generally applied to that formed by the hive or honey-bee. It is formed from the nectar of flowers, and consists chiefly of levulose and dextrose, its flavour partly depending on the particular flowers visited by the bees. If the bees collect "honey dew," the excrement of green-fly, the resulting honey is black and objectionable. Honey is a demulcent and laxative substance, often used as a vehicle for administering medicine, as part of a gargle, or as an external application to ulcers. The honey sold in jars is often diluted with syrup.

Honey-Buzzard, bird of prey related to the kites, and deriving its name from its habit of feeding largely on the

grubs of bees and wasps. It formerly nested in England, but is now only a passage migrant.

Honey Dew, see **MAPLE FAMILY**.

Honey-Eaters, family of birds, mainly Australian, and of small size, differing from their nearest relatives, the tree-creepers and nuthatches, by having a long protrusible brush-like tongue adapted for the extraction from flowers of the nectar on which they feed.

Honey-Guide, African bird about the size of a lark, which takes its name from its alleged habit of leading the ratel (*q v*) to the nests of bees. It is most nearly allied to the barbets (*q v*).

Honey Locust, a leguminous tree, native to N. America, and introduced sparingly into this country, where it may be seen growing in the open at Kew and in some of the London parks. It has long edible pods, which are sometimes sold as sweetmeat.

Honeysuckle, a common twining shrub with highly-scented flowers, red

outside and

yellow

within,

elongated,

with long

stamens

and style.

It flowers in

June and

again in

Oct., and is

found in

woods and

hedges

everywhere.

Many

species are

cultivated,

and require

little atten-

tion, except

water in

very dry

weather, and

the pro-

vision of

trellis-work

or other

suitable

support.



Honeysuckle

Hong Kong, an island, free port and (since 1841) British Crown colony, off the S.E. coast of China, situated at the

1683. There are considerable resemblances between his work and that of Jan Vermeer, and the two painters must have been working in Delft at the same time. His pictures are mostly interiors of the orderly homes of middle-class Dutch families, though examples of open-air paintings and courtyard scenes also exist. His handling of the play of light from windows or doorways is especially characteristic, his pictures are delightfully arranged, his treatment of texture and surface-colour is careful and accurate, and his faithful records



A Dutch Interior, by Pieter de Hooch

of the furnishings, ornaments, and utensils of the households of the time are never tedious, but have real pictorial feeling. Both the National Gallery and the Wallace Collection contain fine specimens of his exquisite workmanship.

Hood, a head covering of ancient origin, used generally in medieval times, it subsequently gave place to the hat, being retained in religious and academic circles, only to indicate degrees. The academic hood indicates the wearer's university and the nature of his academic qualifications. See **COWL**.

Hood, Robin, see **ROBIN HOOD**.

Hood, Sir Samuel (1702-1814),

English sailor who fought at Ushant (1778) and at Santa Cruz under Nelson. At the battle of the Nile (1797) he commanded the *Zealous* and won distinction by his bravery and skilful tactics. As Commodore at the W. Indies (1802) he won a succession of victories against the French, and 3 years later lost an arm at Rochefort. He retired as vice-admiral.

Hood, Samuel Hood, Viscount (1724-1816), British Admiral. During the War of American Independence his brilliantly conceived naval strategy was largely stultified by the obstructionism of his superior officer, Rodney, but he fought the most daring and successful naval action of the war against the French fleet off Basse Terre, St Kitts (1782). Hood was commander-in-chief in the Mediterranean during the French revolutionary war, and occupied Corsica in 1794. Unfavourable weather put a premature stop to his attack upon the French fleet in the Golfe Juan. From 1796 till his death, Hood was governor of Greenwich Hospital.

Hood, Thomas (1790-1846), English poet, is best known for his humorous verses, published in *Whims and Oddities* (1820), the *Comic Annual* (founded 1830), *Hood's Magazine*, and *Whimsicalities* (1844). He began writing as a serious poet. As sub editor of the *London Magazine* (1821), he made the acquaintance of such men as Lamb, de Quincey, Proctor, and Hartley Coleridge. His early work, written under their influence, was not successful, but his comic poems are masterpieces of ingenuity. The best known of his later serious poems are *The Dream of Eugene Aram* (1830), *The Song of the Shirt* (1843), and *The Bridge of Sighs*, the two last, describing the terrible conditions of industrial workers, did much to bring about their improvement. He made great use of the pun in his humorous verse.

Hood Mould, see **DRIPSTONE**.

Hooghly (or *Hughli*). (1) A district in the Burdwan division of Bengal, on the banks of the R. Hooghly. The

countryside is picturesque with fruit gardens and temples. Rice and jute are the important crops. In the towns of Serampore and Champdani jute mills employ a considerable amount of native labour. Area 1185 sq m pop 1 080 138 (*) A town on the R Hooghly Burdwan Bengal. There are a college a mosque of some architectural and historic interest and a 13th cent Portuguese church. Pop (1901) 29 945 (3) The most W branch of the Ganges delta India and an important channel leading to the Indian Ocean (c. 145 m long). The bulk of the Calcutta traffic utilises this branch despite its rapid tidal bore and navigation difficulties.

Hook, Theodore Edward (1768-1841) English author was a very precocious child. His powers of improvisation and mimicry so delighted the Regent that a Government sinecure was procured for him. His works include comic operas articles poems and novels. Best known are *Sayings and Doings* (18 6-9) *Love and Pride* (1833) *Gilbert Gurney* (1836) and *Peregrine Bines* (184.) but he is even more famous as a practical joker. His pranks are recorded in *Life and Remains* by R H D Barham (Thomas Ingoldsby) (q.v.)

Hookah [hoo'ka: AR] an Eastern pipe in which the tobacco smoke bubbles through a vessel filled with plain or scented water then goes by a long tube to the mouth. Harghah and hubble bubble are slight variations of this form. Hookahs are often highly ornamented. Some are fitted with several tubes so that a party of smokers may all draw from the central supply at once.

Hooke Robert (1635-1703) English inventor. In 1635 he was employed by Robert Boyle and assisted in the construction of the air pump. Appointed curator of experiments to the Royal Society in 1660 he became in 1660 Professor of Geometry in Gresham College. After the Great Fire of London he submitted a model for the reconstruction of the City. But

When a plan was accepted and Hooke became surveyor a position in which he accumulated several thousand pounds which were discovered in an iron chest after his death. All his life he was haunted by a morbid fear that someone would anticipate his discoveries. See also AIR RAFT HISTORY OF

Hooker Richard (c 1554-1600) English theologian held several church livings in the provinces and became Master of the Temple in 1581. He is known solely for his *Laws of Ecclesiastical Polity* (8 books 1593-1662). This monumental work laid down the principles of law and reason in religion and politics and had deep influence not only on philosophy and political progress but also on English prose style.

Hooligan, a young rough. The Irish equivalent is corner boy. the Australian larrikin.

Hoolock, a species of Gibbon (q.v.) found in Assam and Burma. The sexes which are alike in size usually differ greatly in colour the male being entirely black with a white brow band and the female typically fawn or brown.

Hoopoe, a beautiful bird of the woodpecker group distinguished by its cinnamon colour varied with black and white bars on the wings back and



Hoopoe

tail its long slender bill and the great crest on the head. The hoopoe feeds on worms and insects and nests in hollow trees. In small numbers it regularly visits England in the spring and formerly bred here.

Hoover, Herbert Clark (b 1874), 31st President of the United States, was born at West Branch, Iowa, of Quaker parents. After graduating from Stanford University, he became a mining engineer. During the World War he was chairman of a committee to assist stranded Americans in Europe, and later controlled the Belgian Relief Committee. Subsequent to the entry of his country into the War, he returned home to become food administrator, and after the Armistice he undertook another vast relief scheme in the organisation of the American Relief Administration which saved the lives of millions of famishing Europeans. As head of the Department of Commerce in the Harding administration, he did much to develop American foreign trade, and in 1928 he by a huge majority defeated his Democrat opponent, Governor Alfred Smith, for the presidency. His administration saw the disastrous Wall Street crash of 1929 and the beginning of the nation-wide depression from which America was still suffering when Roosevelt defeated him in the election of 1932. An important event of Hoover's presidency was the War Debts moratorium in 1931.

Hop, belongs to the nettle family. The plant is a perennial, producing every year fresh shoots which are long, slender, twining stems bearing more or less palmate, rough leaves of a peculiar shade of green, and flowers in catkins. The principal varieties of hop are Canterbury and Farnham white vines, Golding, Grape, Colegate, Fuggle. The bitter principle is a substance of aromatic resinous nature secreted on the scales. Most of the hop fields are in Kent. Hops are mainly used for the making of beer (*q v*).

Culture Deep mellow soil, thorough drainage, and a good climate are necessary, and an old meadow is the best site. The land is trench-ploughed the previous autumn and given a heavy dressing of farmyard manure. Hop cuttings made in the autumn are

planted out in the spring. Cultivation from seed is not successful. Hops were previously trained on poles of sweet-chestnut wood, but now climb on wire and string. In the first season there is no yield, and the ground between the rows is usually planted with a crop of cabbages or potatoes. Harvesting begins about the end of Aug., a tedious process usually performed by bands of town workers who live on the spot for 3 or 4 weeks in huts or tents. Hops are hand-picked and dried immediately in charcoal-heated kilns called oasts. The yield usually averages c. 8-11 cwt per acre.



Leaves and Fruit of Hops

Hope, Anthony, *nom-de-plume* of Sir Anthony Hope Hawkins (1863-1933), English novelist. In his earliest work, the *Dolly Dialogues* (contributed to the *Westminster Gazette*), he achieved the rare felicity of investing the flimsiest of subject-matter with its maximum burden of literary art combined with wit and humour. He is most famous for his romances of "Ruritania," a mythical European kingdom, described in *The Prisoner of Zenda* (1894) and *Rupert of Hentzau* (1898). His more serious novels include *The God in the Car* (1894), *Quisante* (1900), *Tristram of Blent* (1901), *Second String* (1910).

Lucinda (1900) and *Little Tiger* (1925)

Hopkins, Sir Frederick Gowland (b 1861) biochemist and physician. Much of his earlier work concerned the oxidation of plant and animal tissues and in particular the chemical changes occurring during muscular contraction and relaxation. This pioneer work led to the discovery by subsequent investigators of the source of energy in muscular contraction.

Early in the 20th cent Hopkins suggested that scurvy rickets and some other diseases were due to the absence of essential food factors from the diet. These accessory food factors are now termed vitamins (g v) and their importance is generally recognised.

The method widely used to determine the amount of uric acid in urine is due to Hopkins and the biological importance of many other compounds found in organisms has been investigated by him. His brilliant research gained the Nobel Prize for Medicine (1929) and several other rewards.

In 1914 Hopkins became Professor of Biochemistry at Cambridge in 1921 Sir William Dunn Professor and in 1933 President of the British Association for the Advancement of Science.

Hopkinson, John (1849-1899) English engineer and physicist. Senior Wrangler and Fellow at Cambridge he studied engineering in his father's works and set up as consultative engineer. He specialised in electrical work, and was made Professor of Electrical Engineering at King's College London. By developing the theory of alternating current and of the magnetic current in dynamos he paved the way to the common use of electricity in daily life. He was killed with one son and two daughters while mountaineering in Switzerland at the age of 49.

Hoppner John (1758-1810) English painter. Hoppner studied at the Academy schools winning great distinction. In 1780 he exhibited for the first time

at the Royal Academy and had an immediate success as a portrait painter members of the Royal Family and the aristocracy being numerous among his sitters and patrons. He also painted some mythological works including a *Sleeping Venus* and a *Cupid and Psyche*. He was a follower of Reynolds and his work suffered from the same chemical disability.



Lucinda by H. Hoppner

the colour deteriorating very rapidly in the majority of his paintings.

Hop-scotch, an old children's game played in an oblong space marked out on the ground and divided usually into 10 or 12 divisions. A small flat stone is kicked by the player while hopping on one foot into each division in turn.

Horace (Quintus Horatius Flaccus) (65-8 B.C.) Roman poet. He was unhappily involved in the civil wars which preceded the establishment of the Empire but subsequently he aroused the interest of Maecenas whose name has become proverbially associated with the patronage of literature. Through the good offices of Maecenas Horace obtained favour with Augustus and in 33 B.C. he was settled by Maecenas on the Sabine farm where he wrote much of his best remembered

poetry His works are *Salutes*, *Epistles*, and the didactic literary criticism, *Ars Poetica*, which is the model of Boileau's *L'Art Poétique* and Pope's *Essay on Criticism* The foregoing are all written in hexameters (see VERSE) The *Odes* and *Epodes* are collections of shorter poems written in a variety of lyrical measures, and it is upon these, and especially the *Odes*, that Horace's fame chiefly rests Throughout his work there runs a vein of tolerant and genial epicurean philosophy, and although he never touched the heights of pure poetry reached by Catullus or Lucretius (qq v), his poems are characterised by a perfection of technique which, in some respects, is analogous to that of Pope in English verse For this reason he is the most quotable and most frequently quoted of Latin poets, — a further quality which suggests a partial analogy between him and Pope

Horæ [horæ] ("Hours"), in classical mythology the goddesses of the hours or seasons, were daughters of Jupiter They were keepers of the gates of Olympus and presided over the seasons and so over the weather

Horatius Cocles [ko'klez], Roman hero who, with 2 companions (some authorities say, alone), defended the bridge over the Tiber against Porsena and the Tuscan Army, while the Romans cut it down on the Roman side As it collapsed, Horatius dived into the river, and in full armour swam to the bank The story is related by Macaulay in *Lays of Ancient Rome*

Horder, Thomas Horder, 1st Baron (b 1871), British physician, has held the post of physician in Ordinary to the Prince of Wales since 1923 He is senior physician to St Bartholomew's Hospital, consulting physician to the Cancer Hospital, Fulham, and President of the National Birth Control Association He is the author of several medical works Created baronet 1923, raised to peerage 1933

Horehound, White and Black, plants belonging to the deadnettle family.

Black horehound is a bushy plant 2-3 ft high, with heart-shaped leaves, and numerous one-sided clusters of purple flowers The whole plant has a strong and offensive odour The white horehound has bushy stems 1-2 ft high covered with woolly down, wrinkled leaves, and dense whorls of small white flowers, It has a pleasant aromatic smell and bitter taste, and is used as a remedy for coughs Both plants are common on waste ground and flower in Aug

Hormones are generally defined as chemical agents which excite the functions of organs other than those that produce them Some authorities include under this heading those agents which produce an excitation of any kind, whether stimulating, depressing, or inhibiting. Others restrict the use of the word to stimulants, and use the term *chalones* for any agent exerting either a depressing, or inhibiting, influence Hormones and chalones are included together as *autocoids* The production of hormones is the sole function of certain groups of cells, such as the islets of Langerhans in the pancreas (q v) and of certain glands, such as the thyroid, pituitary, and other endocrine organs In human beings, the balanced secretion of hormones is essential to mental and physical development and health See also BIOCHEMISTRY, CRETINISM, DIABETES, GIANTS, GOITRE; METAMORPHOSIS, GLANDS; ENDOCRINE SYSTEM

Hormuz, a small island, near Straits of Hormuz, S Persia Formerly a great trading centre, its only resources now are rock-salt and red ochre Bandar Abbas, 11 m. distant, is the new trade depot for the area Pop c 1000

Horn: (1) hero of a Middle English romance (13th cent) usually known as *King Horn*. It is a poem of over 1600 lines, with a subject very like that of *Havelock the Dane* It was re-edited by the Early English Text Society in 1901. (2) General term for large weapons composed of bone or chitin (horny material) de-

veloped by animals for offensive or defensive purposes. Horns may consist of bone alone as in the deer or of bone covered with a chitinous sheath as in cattle, sheep and antelopes or with hairy skin as in giraffes or of chitinous material consolidated hair and skin as in the rhinoceros (3) (Mus.) see ORCHESTRA

Hornbeam, deciduous tree (*Carpinus*) native of Europe, Asia and America, similar to the beech but the bark although smooth is marked with streaks and the tree has a tortuous spirally twisted and gnarled appearance. The leaves unlike those of beech are serrated and the fruit consists of hanging keys. Hornbeam often mixed with beech makes a good hedge. The tree does not reach a great height and is little valued for timber or ornament but provides good fuel. The wood is exceptionally hard.

The hop hornbeam is a tree related to *Carpinus* but its fruits resemble hop cones whence the name.

Hornbill, name for a number of large tropical African and Asiatic birds of the woodpecker group, especially distinguished by their huge bills which are typically surmounted by a bony growth forming a kind of helmet on the head. Hornbills are gregarious birds and feed on fruits, seeds and a variety of small animals like insects and even snakes. At nesting time the female retires to the hollow of a tree and the cock bird plasters up the hole with mud leaving only a slit through which he feeds her until the young are ready to emerge.

Hornblende is a naturally-occurring mixed silicate of calcium, magnesium, iron and aluminium. The term sometimes designates the aluminium metasilicate alone.

Horn Book, name given to a school primer in the form of a sheet printed with the alphabet mounted on a board and covered with transparent horn, formerly used by school-children to read a handle attached so that it might be hooked to the belt and so carried.

Horne, Henry Sinclair Horne 1st Baron (1861-1929) British general served in the S. African and World Wars rising to the rank of major general after the first Battle of the Marne where he fought with distinction. He was knighted (1916) and given command of the 1st Army. For later distinguished successes he was raised to the peerage and was awarded a grant of £20,000.

Horned Toad, a harmless lizard of the Iguana family found in the deserts of the S. States of N. America and distinguished by its broad flattened body, short tail and by the presence of bony spines on the head and back. Horned toads are 4 or 5 in. in length and feed upon beetles and other insects. Some of the species are remarkable for producing living young, the family sometimes numbering two dozen and for their habit when handled of ejecting spurts of blood from their eyes.

Hornet, a large species of wasp resembling the common wasp (*Vespa*) in habits and life history. It is not so plentiful in England as typical wasps but is dreaded on account of its more painful sting due to the deeper injection of a larger quantity of poison. It usually nests in hollow trees but sometimes in barns and similar situations.

Hornfels, name given to certain impure limestones, dolomites and calcareous or dolomitic shales which have been metamorphosed to the extent of partial or complete recrystallisation by contact with hot intrusive gneiss rocks. They are typically compact and close grained and vary according to the original rock. Metamorphosed shales yield brown or black hornfels with dark mica. Altered limestone produces lime silicates and is termed a calc silicate hornfels. A good example of this has been produced by the intrusive shap granite in Westmorland.

Horniman, Annie Elizabeth (b. 1860) founder of the repertory theatre system in England and a generous

producer of the works of young and unknown authors. She gave a Shaw-Yeats season in London in 1894, established Dublin Abbey theatre 10 years later, opened the *Gaiety* at Manchester for repertory work in 1908, and from then until 1921 produced more than 100 original plays. Many well-known actors have been trained in her theatres. She became a Companion of Honour in 1933.

Horn Implements, see **STONE AGE**

Horning, Letters of. In Scots law, warrant for charging persons to pay or perform certain debts and duties, so called because they were originally proclaimed by horn or trumpet.

Hornung, Ernest Wm. (1866-1921), English novelist, creator of "Raffles," who first appeared in *The Amateur Cracksman* (1899). His other famous character, of a similar type, was *Singaree* (1906). Many of his stories deal with Australia, which he visited in 1884-6.

Horology, see **CLOCKS AND WATCHES**

Horoscope, see **DIVINATION**

Horrocks, John (1768-1804), British cotton manufacturer, the son of a quarry-owner. While stone-working in his father's business, he set up a few spinning-frames, after a time relying entirely on them for his livelihood. In 1791 he set up mills in Preston, which he represented in Parliament as a Tory from 1802 till his death.

Hors d'Œuvres, small, highly-flavoured dishes intended to stimulate the appetite. They should be attractive in appearance, and served cold in small dainty portions. They should be placed on the table before the diners enter the dining-room. They can be served singly or collectively (*hors d'œuvres variés*). A special dish divided into 4, 6, or 8 portions is used in the latter case.

The following are foods which can be served as *hors d'œuvres*.

Oysters, allow 1 to 6 for each person. Break them open, with the deep shell underneath. Arrange them on a plate with the valves towards the centre. Garnish with thin slices of

lemon and parsley. Surround finely chipped ice, and serve with slices of brown bread.

Caviare is served on canapés (see SAVOURIES), or from the jar, brown bread and butter being passed round separately.

Olives are served plain or stuffed.

Other articles of food which are used as *hors d'œuvres* are, sardines (boned), smoked salmon, anchovies (boned), *salmi* (hash made of roast game), *sausage* (in very thin slices), *smoked ham*, *tunny* (pickled), *prawns*, *shrimps*, *foie gras* (fat goose liver), *Russian salad* (mixed vegetables), *beetroot*, *radishes*, *eggs in sauce*, *gherkins*, *potato salad*, *cucumber*, *tomatoes* (slices with chopped parsley, flavoured with a little onion, oil, and vinegar).

Grape-fruit and melon are given as *hors d'œuvres*. Little pats, curls, or balls of butter are sometimes served on small glass dishes. Small biscuits or crisp toast should be handed round. Special small-size knives and forks are made for *hors d'œuvres*, but fish knives and forks can be used instead.

Horse, in zoology, a general name applied to the family of horses, asses, and zebras (*Equidæ*) which belongs to the odd-toed or *Perissodactyle* (q.v.) order of hoofed Mammals, and is characterised by possessing only a single toe on the foot. Popularly it is applied in a restricted sense to the typical horses which are distinguished from asses and zebras by having warts on the hind- as well as on the fore-legs, by the flowing mane and forelock, smaller ears, and by the tail being long-haired to the root.

It is in the domesticated races that the differences in the mane and tail are most conspicuous, for in the single existing wild species, known as *Przewalski's* or the Mongolian wild horse, the mane is *hogged* and the tail scantily hairy at the root, at all events in summer. This horse is little more than a pony, standing c. 13 hands, is dun in colour, with some black on the mane, tail, and legs, and has a mas-

nse head with large grinding teeth. It is probably one of the species concerned in the ancestry of domesticated breeds.

Evidence that other species were available for taming by early man is supplied by engravings on implements and walls of caves and by skeletons attesting the existence apparently of several distinct kinds of wild horses differing in stature, length and stoutness of limb and other characters in Europe in prehistoric times and it is believed that one possibly more of these was tamed by men of the Neolithic period. Since then a number of different types have been developed. But it is not known how many species are involved in the ancestry of modern breeds. Some people think the marked differences between such types as thoroughbreds, cart horses and Shetland ponies are traceable to three distinct species; others that the differences are due to selective breeding from a single stock aided by the

The earliest records of the horse as a domesticated animal suggest that it was used mainly in warfare for riding and chariot-drawing. For these



Shire stallion

purposes a combination of speed, endurance and strength would be required. It is not unlikely that from a war horse possessing these qualities was derived the powerful charger used in tournaments in the Middle Ages and that a breed of the latter type was the source of the Clydesdales, Shires and other heavily built cart horses which were introduced to replace even for draught purposes. But the breeds of uncertain origin that have had the greatest influence on modern European horses are the Barb and Arab, famous for speed and hardiness which came from N. Africa and on account of their special qualities were imported into Spain and other European countries and were brought to England in the 17th and 18th cents. It is from these that our race horses trace their descent and their stamp more or less mixed may be detected in several lightly or more strongly built, fleet-footed breeds like polo ponies, hunters, hackneys and others. Similar N. African horses were taken by the Spaniards to America where there were no indigenous horses and some of them, running wild on the prairies, gave rise to the vast herds of mustangs which supplied the Indians with the means of contributing to the extermination of the bison. It was



- | | | |
|---------------------|------------------|-----------------|
| 1 muzzle | 15 cannon | 31 flank |
| 2 nostril | 16 back | 32 sheath |
| 3 forehead | 17 lock | 33 lock |
| 4 jaw | 18 coronet | 34 hip joint |
| 5 pole | 19 hoof | 35 hilt joint |
| 6 rest | 20 heel | 36 th. gtr. |
| 7 throat | 21 withers | 37 quo. lers. |
| 8 shoulder | 22 back | 38 back |
| 9 point of shoulder | 23 r. br. | 39 part of neck |
| 10 ear | 24 circumference | 37 armet bone |
| 11 true arm | 25 body girth | 38 neck joint |
| 12 elbow | 26 lark | 39 coronet |
| 13 fo. e arm | 27 crop | 40 hoof |
| 14 knee | 28 hip | 41 heel |

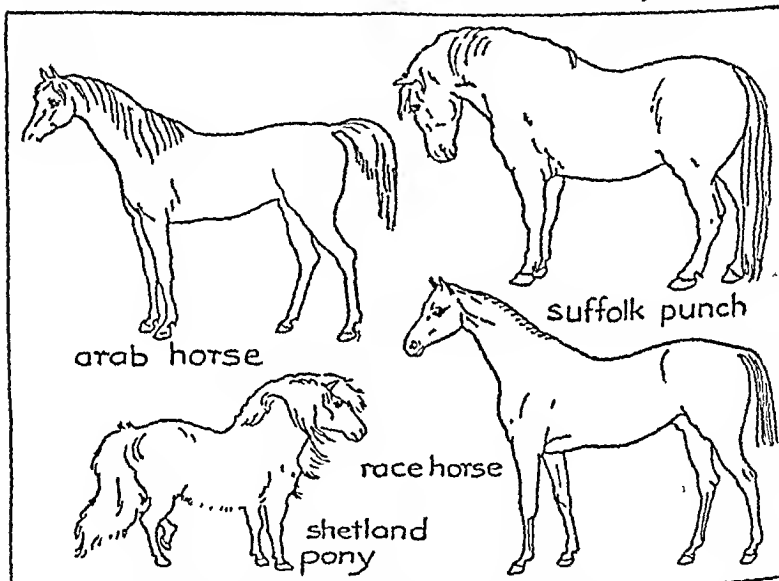
effects of environment as in the Shetland pony which has been dwarfed and otherwise restricted by isolation in its rugged N. h.

also from horses with Arab blood that the famous "American trotters" were derived

Domesticated horses, like most domesticated animals, show every gradation in colour from black, through bay, chestnut, and dun, to grey and white, or a combination of these tints. But there are reasons for thinking that the remote ancestor of the horse was striped, after the manner of a zebra. It is indeed

continent and was probably evolved there, but entirely died out after it had spread by a N. land route into Asia and Europe.

The intelligence of a horse is much less than that of a dog, but it is extremely docile and responsive to kind treatment. The good condition of a horse depends on thorough grooming to remove sweat and scurf, and frequent small feeds; it is usual to clip horses so that their coats may be more easily



Horses, developed under Various Environments and by Breeding

possible that in the "dappled grey" we get a throw-back to the pattern of one ancestor, but it is generally believed that a dun-coloured horse with black "points," a black spinal stripe, and a cross stripe on the shoulder was the dominant stock of our domesticated breeds.

Although there were no indigenous horses in America when it was first discovered by Europeans, the evidence of fossil remains shows that the family was at one time found all over that

kept clean, but the hair is left round the heels of cart-horses, and horses whose winter coats are clipped require a rug when standing still in the open or in a cold stable. The horses's hooves grow continually, and in natural existence wear and tear keeps pace with growth, but in civilisation where roads are hard the hoof must be given the protection of an iron shoe, nailed to the hooves so as to avoid the quick, though a horse put out to graze and living on soft ground with little

exercise may require its hooves to be cut. The teeth of a horse unlike those of man and the dog are continually growing and from their development the age of a horse can be estimated.

In its wild life the horse would live on grass and cereals and an unworked horse can live comfortably by grazing. Energy producing foods such as oats maize barley leguminous plants and the like are necessary for a working horse these foods must be given in small quantities and at as frequent intervals as practical circumstances will allow usually at least 4 times a day but precaution must be taken against either overloading the stomach or allowing it to remain empty too long. Chopped hay (chaff) is often mixed with the corn to prevent bolting. Water is never given after but always before corn lest the water swell the corn in the belly and cause colic. Oats are the usual food up to 10 lb a day together with the same quantity of hay.

upland hay is the best. The horses digestion works rapidly so that he can work continuously with short rests. Horses can sleep standing up but a soft bed of straw or peat is provided in the stable which should be kept scrupulously clean.

Male horses are usually castrated in this country when the foal is a year old a castrated animal is called a gelding. A mare casts her foal from 345 to 365 days after conception.

The most troublesome ailment of horses is colic caused by the retention of gases in the belly from fermentation of food and often brought on by watering directly after a feed. The horse suffers from intermittent pains and should be kept moving to prevent his lying down as he may displace a gut by kicking violently when the spasms come on. The pain may be eased by a chloral hydrate ball and the gases reduced by a ball of ammonium carbonate and a hot draught of whisky will often put matters right.

Horse-chestnut (*Æsculus Hippoceras*)

(*asus*) a hardy deciduous tree of the family Sapindaceæ 50-100 ft high with a straight bole unbranched for some distance then branching into pyramid shape bearing large leaves divided into 5 elliptical leaflets with toothed margins pointed to the long frequently red stained leaf stalks. The inflorescences are numerous and showy the flowers being pink (*Æsculus carnea*) white (*Æ. chinensis*) or yellow (*Æ. glabra*). The trees require a deep soil. Young trees are planted from

Oct to March.

Propagation is

by seeds sown

as soon as ripe

3 in deep in a

sunny border

or by grafting

performed in

March or bud

ding in July.

The tree was

first intro

duced into

England early

in the 17th

cent. The

timber is of little value being used

mainly for packing-cases. See also

CHESTNUT.

Horse Fly name for a family of blood sucking flies (*qv*) of which the commonest species sometimes called the *clg* is very active in hot weather and alights so quietly on the human skin that the prick of its bite is often the first intimation of its presence. It is only the female that bites the male feeding on the juices of flowers. A larger species is often very troublesome to horses and cattle and the horse disease known as Surra is transmitted and spread by flies of this family. The larvae live in damp places and feed on other larvae and earth worms.

Horse Guards Royal, see GUARDS TIE.

Horsemanship see RIDING.

Horse-racing which was a feature of the public games in ancient Greece and Rome may have been introduced into



Horse-chest L.

Britain by the Romans, but the earliest English reference is found in William Fitzstephen's *History of London*, 1174. Public races were established at



Leading in the Winner

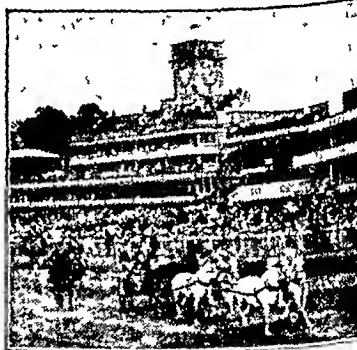
Chester as early as 1512, and the popularity of the "Sport of Kings" increased greatly under the Stuarts. Races have been held annually at Newmarket since 1007. The *Racing Calendar*, an annual record of all races held, with their winners, prizes, etc., was established in 1727. The *Jockey Club*, the governing body of racing in England, was formed in 1750. Executive work is entrusted to 3 stewards, one of whom retires each year; the Jockey Club stewards are *ex-officio* stewards of Ascot, Epsom, Goodwood, and Doncaster. Other meetings are controlled by specially appointed stewards. The "Classic" races in England are the Derby, the Oaks, the St Leger, and the Two Thousand and One Thousand Guineas.

The *Derby*, a sweepstake for 3-year-old colts, was founded by the 12th Earl of Derby in 1780. He had founded the *Oaks*, for 3-year-old fillies, in the previous year. Both are run on

Epsom Downs, over a course of 1 1/2 m. during the week before Whitsun, the Derby on the Wednesday and the Oaks on the Friday. The *St. Leger*, a sweepstake for 3-year-old colts and fillies, was founded by Colonel St. Leger in 1776, and is run at Doncaster in September over a 2-m course. The Derby, Oaks, and St Leger were held at Newmarket from 1915 to 1918. The *Guineas* are run at Newmarket at the first Spring Meeting. The *Two Thousand* for 3-year-old colts and fillies was established in 1809, the *One Thousand*, for fillies, in 1814.

The *Ascot* race-meeting, established by the Duke of Cumberland in 1727, is held annually in June, and is one of the features of the London "season." The chief races are for the *Gold Cup*, first run in 1807, which from 1845 to 1853 was known as the *Emperor's Plate*, having been presented by the Tsar of Russia, the *Queen's Vase* (1838), the *Royal Hunt Cup* (1843), the *New Stakes* (1843), and the *Alexandria Plate* for 4-year-olds, presented by the then Princess of Wales in 1865.

Goodwood races, established by the Duke of Richmond in 1802, are held at



The Grand Stand, Ascot

the end of July. The *Goodwood Cup* race has been run since 1812, the *Goodwood Stakes* since 1823, the *Stewards' Cup* since 1840, and the

Richmond Stakes for 2 year-olds since 1877

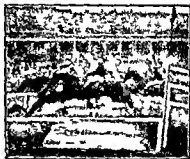
At **Newmarket** 8 race meetings are held annually the Craven meeting 2 spring meetings 2 July meetings 2 Oct. meetings and the Houghton meeting. Among the more important races apart from the **Guineas** are the **Cesarewitch** and **Cambridgeshire** handicaps established in 1830 the **Prince of Wales** and **Jockey Club Stakes** (1894) the **July Stakes** (1786) and **Middle Park Stakes** (1866) for 2 year-olds. Other races for 2 year olds are the **Woodcote Stakes** held at Epsom since 1807 and the **Champsagne Stakes** at Doncaster since 1853.

In **handicap** races each horse is allotted extra weight to carry according to age or form. Handicapping is done by officials licensed by the Jockey Club. Important handicap races in addition to the **Cesarewitch** the **Cambridgeshire** and the **Stewards' Cup** are the **City and Suburban** held at Epsom since 1861 and the **Lincolnshire Handicap** established in 1863. In **selling** handicaps the winner is always put up to auction immediately after the race. Race meetings near London are held regularly at Sandown Park where the **Leopard Stakes** have been run annually since 1884 and at Gatwick Lingfield Newbury and Hurst Park. Liverpool Manchester Birmingham Brighton and York all have 2 or more meetings each year.

The **American seat** for jockeys with the saddle well forward on the horse's withers, very short stirrups and the reins grasped near the horse's mouth was introduced c. 1900 and has almost supplanted the old upright seat.

Steeplechasing is a form of horse racing involving jumping as opposed to flat racing. Originally steeplechases were held across-country with a church steeple or other prominent object, as a guiding mark, and this form is still often held under the name of **Point-to-point** being usually confined to *bona fide* hunters. Steeplechases proper are now usually held on prepared courses jumps.

These races are controlled by the **National Hunt Committee** consisting of 6 stewards elected annually. The rules state every course must have at least 12 fences in the first 2 m. and 6 in every subsequent mile a water jump 12 ft wide by 9 ft deep and at least one ditch 6 ft wide by 3 ft deep with a 4½ ft fence behind. By far the most important English steeplechase is the **Grand National** which has been held annually in April at Aintree near Liverpool since 1839. The course of 4½ m. includes 30 jumps and is a very severe one only a small proportion of the starters usually completing. The **Lancashire and Lancashire** steeplechase is an annual race at Manchester in April.



G. D. H. K. 1. TAKING THE BROOK.

The **National Hunt** steeplechase is held on a different course every year. It is confined to horses which have never won any race. The winners of the Classic races and the **Grand National** since 1930 have been the Derby 1930 Blenheim 1931 Cameroman 193 April the Fifth 1933 Hyperion The Oaks 1930 Rose of England 1931 Brolette 1932 Udayur 1933 Chat laine The Two Thousand Guineas 1930 Diolite 1931 Cameroman 1932 Orwell 1933 Rodosto The One Thousand Guineas 1930 Fair Isle 1931 Four Course 1932 Handy 1933 Brown Betty The Grand National 1930 Shaun Goilin 1931 Grakle 1932 Forbra 1933 Kellsboro Jack.

Racing in *Australia* is controlled by the *Australian Jockey Club*, and the *Victoria Jockey Club*. The principal centres are Sydney and Melbourne, and the most important race the *Melbourne Cup handicap*.

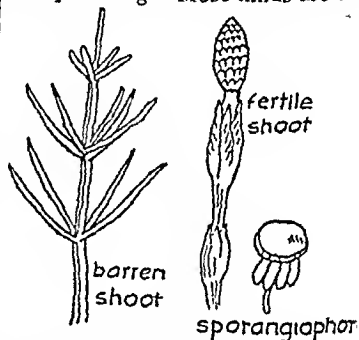
In the U.S.A. the governing body in the E States is the *Jockey Club* of New York, and in the Middle W., the *Western Jockey Club* of Chicago. The various racing associations of the S States and the Pacific Coast have retained their independence. Flat races usually take place on "dirt" tracks instead of turf. *Trotting-races* in the U.S.A. have always rivalled ordinary racing in popularity. Since 1850 they have usually been "in harness," the horse drawing a "sulky," a light, 2-wheeled vehicle, weighing only c 40 lb. Results are judged on the time taken over a 1 m course.

Organised racing in *France* dates from the foundation of the *Société d'Encouragement des Races des Chevaux*, the French Jockey Club, in 1833. The chief racing centres are Chantilly and Longchamps, and the most important race is the *Grand Prix de Paris* for 3-year-olds, held annually at Longchamps over a course of 1 m 7 fur. See also GAMING AND WAGERING.

Horseradish, cruciferous plant native in England and Europe generally, the roots of which are shredded and eaten with beef. Horseradish can be grown in any kind of soil and position; the ground should be trenched in midwinter and the trench bottom covered with well-decayed manure, and straight roots planted with the crown 6 in below the surface. The roots are lifted about Christmas time. See also SPICES AND CONDIMENTS.

Horsetails (*Equisetum*), a small genus of plants representing an entire class of the group *pteridophyta*, somewhat related to the ferns, and represented by c 20 species, temperate and sub-tropical in distribution. From the underground stem arise erect, hollow, jointed stems finely grooved and solid at the joints, which have toothed

sheaths dovetailing into the joint and from which whorls of branches arise. These branches are green and needle-shaped, and bear tiny scale-like leaves. At intervals the underground stem gives off fertile shoots which terminate in a cone, the scales of which are circular and attached by their centres, and bear spores in tubular sporangia on the underside. A number of horsetails are found in England, mostly in stream woods, and damp places, but sometimes in meadows or on very dry ground. The stems are covered with silica, and one species is the Dutch rush of commerce, which is used for scouring and polishing. Most kinds are only

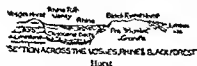


few feet high, but a species from Brazil reaches 30 ft. They date back to the Triassic period.

Horsham, a market town, Sussex, with a number of small industries: brickyards, iron and brass foundries, brewery, and pottery works. Christ Hospital (qv), the well-known "Blue coat" School, is situated near the town. Pop (1931) 13,579.

Horst, in geology, a term strictly applied to a block of country elevated by earth movement either actually, or relatively, owing to depression of the land on each side, and which, being composed of harder rocks than the surrounding country, remains projecting as a range of hills or mountains. The best-known examples are the horsts of the Vosges and Black Forest.

with the rift valley of the Rhine between (see FAULTS). The term is also applied to an area of country which remains stable while surrounding



beds are folded without necessarily being moved.

Horthy de Nagybánya, Nicholas (b 1869) Hungarian statesman, admiral and regent. He rendered distinguished naval service against Italy in the World War and after the Armistice commanded the Hungarian Navy. He became regent of Hungary (1909) and notwithstanding the attempts of the ex-King Karl to regain his throne (1901) has retained that position.

Horticulture the scientific name for gardening embracing the intensive cultivation of fruit and vegetables and of ornamental flowers, shrubs and trees. It may be studied at educational centres and its general advancement is promoted by various societies and institutions including the Royal Horticultural Society (founded 1804).

Horus, an Egyptian deity, god of the sun, closely resembling Ra (q.v.).

Hosiery Manufacture is a term for all textile under garments and stockings which are made on the looped web principle either by hand or on a frame. In hand knitting a loop is formed on a plain needle which may be steel, bone or wood and of any length and is made to intersect with another loop, the work being performed one stitch at a time in horizontal rows. The resulting fabric is thus composed of interdependent loops and if two needles are employed will have a selvedge on both sides. If three or more are used a circular web will be produced as in stockings. In 1539 the Rev. William Lee introduced a knitting frame for forming a row of loops at one operation. This included a row of horizontal needles made of

spring wire and hooked at the ends. The thread was pressed into loops hanging between each of these needles and the loops were simultaneously slipped under the hooks. The loops of the previous row were then pushed over the closed hooks and a continuous flat web of fabric resulted.

This frame has formed the basis of all hosiery machines up to the present time. It had 16 needles for every 3 in. whereas many modern machines have as many as 120 for the same distance. In Lee's machine the thread was applied by hand and only in 1837 was the straight bar rotary frame which was self-acting invented by Luke Barton. The knitting frame was also adapted to rotary principles by Moses Mellor of Nottingham. Vertical needles were ultimately used enabling seamless stockings to be made. The rotary frame of William Cotton has enabled good hosiery to be produced cheaply. It is mechanical and driven by steam power.

Warp knitting differs from frame work knitting in having a separate thread for each needle and by means of the Dawson wheel the threads can be laid in any direction. It is especially suitable for shawls and fancy stockings. Circular knitting on the loop wheel circular frame with vertical self-acting or latch needles is used in making circular fabrics and rib-work is produced on various types of machine by a second row of needles at right angles to the first. Rib-work gave rise to open work in which various needles remain empty. The chief hosiery manufacturing centres in Britain are Leicester, Nottingham and Hawick.

Hoskins, John (? 1804) English miniature painter. Examples of his work are at Windsor Castle and in private collections.

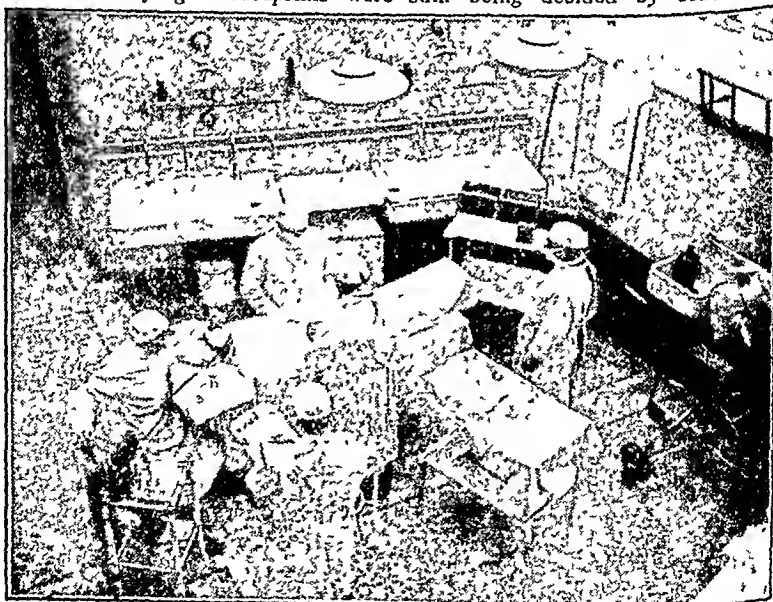
Hospice, name of certain houses for pilgrims and travellers kept by Christian religious orders. The most famous is the Hospice of the St. Bernard Pass in the Alps.

Hospital, establishment for the care and cure of the sick, the word being

derived from the Latin *hospes*, a guest. Medical schools were attached to the temples of Saturn and other gods long before the Christian era, and in the later Roman Empire hospitals were instituted, not only for human beings, but for animals. During the Middle Ages, the hospital system fell into almost complete desuetude, only recovering with the development of modern medicine towards the end of the 17th cent. In 1710 the well-equipped hospitals in England were St Thomas's (1200), and St Bartholomew's (1123), while in the provinces the sick had to be cared for in the home. Westminster, Guy's, and St George's Hospitals were founded in London during the next 25 years. All these were for general treatment, and it was not until the 19th cent that separate provision began to be made for special cases, though the City of London and Queen Charlotte's Lying-in Hospitals were

both established in the 1750's. To-day there are special institutions for children, women, foreigners, fever cases, infectious diseases, paralysis, consumption, and for diseases of the teeth, eyes, skin, throat, nose, ear, etc.

There are at present three methods of hospital organisation—by the State, as in Scandinavia and most European countries, by the municipality, as in the United States, and by voluntary contributions, as in Great Britain. Although the latter system has certain advantages, yet the effort and uncertainty of money-raising is an undoubted strain upon hospital organisation. Moreover, under the voluntary free system, both the rich and the poor can command expert attention almost to the exclusion of the middle class. This difficulty has been combated since 1909 by the introduction of payment according to means, the sum being decided by consultation



Operating Theatre of the London Hospital, showing operation in progress

the tap is opened. Greatest efficiency is attained by running water through the geyser mod rately slowly. Boiling water involves a disproportionately high gas consumption and leaves a deposit of fur inside the heater.

Storage heaters hold from 2 to 40 gallons according to the purpose for which it is needed. The water is heated in a cylinder and maintained at a suitable temperature of say 140° F for domestic purposes by a small jet automatically controlled by the temperature of the water. In recent designs a lead coating to the steel outer casing protects against rust. Cold water is rapidly heated as it enters between the heating chamber and the air jacket, the hot water immediately rising to the dome where it is carried off by a central pipe ensuring a continual supply.

By Electricity. Water heating by electricity is obtained by an element enclosed in a tube which is immersed in the water and can be substituted easily in other systems. Two holes cut in the storage tank admit the heating unit and an automatic thermostatic control. A 3 way switch may be used instead turned low during the night so that the water will be moderately hot by morning. Full current gives a considerable volume of hot water and medium maintains a sufficiently high temperature for most purposes. Thermostatic control is simple and eliminates waste. It will maintain any temperature from 50° to boiling point but should not be set higher than 185° or hard scale will form on the element. The thermostat is valuable when an electric heater and a fired boiler are used together ensuring a constant uniformly hot supply.

Electric heaters have no fumes and reduce labour and cleaning to a minimum. The water is clean being stored in a tinned copper cylinder and is suitable for drinking or cooking. A small heater for the kitchen measures c 13 x 9 in and can be fastened to the wall above the sink. A cistern

type similar in appearance to a gas geyser will supply a full hot bath within an hour.

By oil. Oil burning equipment is invaluable in districts not served by gas or electricity as it is easier to handle than coal, keeps a level temperature, feeds automatically without stoking and is inexpensive and cool. A large house hot water supply need not mean excessive summer heat in the kitchen. It may be combined with an oil burning cooking range. An oil geyser similar in appearance to the gas geyser can be installed anywhere with reasonable ventilation. It is heated with methylated spirit and pumped like a picnic stove. The flame is clear and free from soot with efficient heating so that a good hot bath is prepared in 10 minutes. Flame does not touch the water which if suitable can be used for both drinking and washing. In large boilers for central heating and domestic water supply the fuel is forced through a nozzle and the stream of fine oil particles mixed with a stream of air from electric blowers. Water is heated quickly by this type of burner. A size suitable for the average house will supply 2 hot baths an hour after lighting.

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The fuel for water heaters varies according to their design, and is usually specified by the makers.

always in communication through a passage containing a number of thin wrought-iron plates which act as regenerators. When the power piston is at the bottom of its stroke, the air is compressed and heated, forcing the piston upwards, the diameter of this piston being larger than that of the displacer piston. The latter is descending during the upward stroke of the power piston, and thereby forcing air from the water-cooled displacer cylinder through the regenerator, into the power cylinder where it is heated and helps to drive the piston to the top of the stroke. When the power piston reaches the top of its stroke, the displacer piston is at half stroke upwards, and the descent of the power piston forces air from the power cylinder through the regenerator, where some of the heat is stored in heating up the iron, the rest of the heat passing into the water-cooling system of the displacer cylinder. The best thermal efficiency realised even in large engines is only c. 7.9 per cent.

Hôtel de Ville [ôTEL dE vIL], a French town hall, of which the oldest example, dating from c. 1150, is at St Antonin (Tarn-et-Garonne).

Hôtel-Dieu [ôTEL dYê], a medieval French hospital, now applied only to those still existing which date from medieval times. The principal characteristic of the *Hôtel-Dieu* is a huge room or hall in which were placed the beds of the sick, who were attended by nuns. Examples from the Gothic period are to be found at Angers (1153—84), Ourscamp (early 13th cent.), Tancre (1300), and elsewhere.

Hothouse, specially-heated glass building for tropical and delicate plants which cannot stand the ordinary climate. It has a minimum winter temperature of 60° F. Where the cost of the necessary heating is not prohibitive, a hothouse is a valuable auxiliary to the garden. A hothouse should be constructed from well-seasoned timber and glazed without putty, and must be well ventilated.

Hot Springs, a health resort of Arkansas, U.S.A., renowned for its thermal mineral springs. Pop. c. 20 200.

Hottentot Languages are over 15 in number, of which that known to its speakers as *Nama* is of primary importance. The chief phonetic characteristics are the significance of varieties of tone, the use of clicks (qu), of nasalised as well as non-nasal vowels, and an *r* sound, which is a kind of mixed *r*, *l*, and *d*. The vocabulary is monosyllabic. Nouns are inflected to form the singular, dual, and plural numbers, the vocative and objective cases. The verbs are conjugated in 6 tenses. The grammar is remarkable for regularity and the absence of exceptions.

Hottentots, see AFRICA, PEOPLES OF.
Hot-water Supply. Hot water for domestic supply is provided by systems using gas, electricity, oil, and solid fuels.

By Gas. Hot-water "geyser" heaters, though efficient, have in the past involved frequent cleaning of the copper surface and some danger of explosion or poisoning through careless handling. Latterly an enamelled surface frequently of vitreous porcelain, or stainless chromium plating, has replaced the copper finish. Cleaning can then be effected with a soft cloth, soap, and water. A double tap which turns on both gas and water simultaneously by one handle avoids explosion risks. Some geysers have an automatic device, whereby the inflowing water controls the supply of gas. There is little danger of asphyxiation with a well-installed geyser having an efficient flue or ventilation pipe with a baffle to prevent downdraughts.

Multi-point automatic geysers supply hot water to any tap in the house, for bath, basin, or sink. Instantaneous water heaters are now lined with copper or tinned copper, and the water is free from impurities. Some models vary the heat of the water delivered according to the degree

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Regular cleaning and the removal of "fur" from the boiler in "hard" water districts will increase efficiency
See also CENTRAL HEATING

Houdon, Jean Antoine (1741-1828), French sculptor, born at Versailles. At the age of 20 he won the Prix de Rome. He remained in Italy for the next 10 years, and quickly became a celebrity after his return to Paris. His portrait-busts include those of Molière, Voltaire, Napoleon, Josephine Bonaparte, and many other celebrities of the time. His head of Rousseau in the Louvre was modelled from the death-mask which he himself travelled to Ermenonville to take. In 1785 he went to America in order to execute a commission for a statue of Washington. Napoleon awarded him the Légion d'honneur.

Houghton, Richard Monckton Milnes, 1st Baron (1809-1885), English man-of-letters, was a friend of Thackeray and Tennyson. He founded the Philobiblon Society, and took part in educational movements. His works, which were less important than his influence, include a *Life of Keats* (1848) and *Monographs* (1873), essays.

Hound, see Dogs

Hound's Tongue, a stout herbaceous plant 1-2 ft high, with large downy leaves, purple flowers, and large flattened seeds covered with barbed prickles, which stick to the wool of animals. The whole plant has a strong disagreeable smell, and is fairly common on waste ground, flowering in July. *See also* HERBS

Hounslow, a town in Middlesex. The only industry of note is the manufacture of gunpowder. Kneller Hall, the Royal Military School of Music for training Army bandmasters, is situated here. Hounslow Heath, which at one period extended over 5 in., was a famous haunt of highwaymen. Hounslow forms part of Greater London. The regimental depot of the Royal Fusiliers and the record and pay office of the Middlesex Regiment are here. Pop (1931) (Heston and Isleworth) 75,446.

Hour-glass, a device for measuring time, consisting of two closed glass vessels connected by a very narrow passage and containing sand, enough nearly to fill one of them. The quantity of sand and the size of the passage are adjusted so that the sand passes completely from one vessel to the other in a given time. Hour-glasses are now used only in kitchens for timing the boiling of eggs, and similar operations.

Hours, Canonical, hours or times set aside for prayer as prescribed by rule or canon. In the first four centuries there were besides Matins or Nocturns, six hours, viz. Lauds, Prime, Terce, Sext, None, and Vespers, but St. Benedict (6th cent.) added Compline, the seventh hour and closing service of the day, the whole corresponding to the Psalmists' praises of "seven times a day." The origin of the Canonical Hours may be traced to the Jewish custom of praying at the third, sixth, and ninth hours, and these times of prayer are mentioned in the Acts of the Apostles (ii 15, iii 1, x 9). *See also* BRI VIARY

Hours of Work. One of the most striking tendencies in modern social life is a steady reduction in hours of labour. In mediæval times, apart from the limitations of daylight and festivals, hours worked were dependent entirely upon the decision of the master. A tradition of paternalism, however, usually kept them within reasonable limits. With the introduction of factories by the Industrial Revolution (qv) a large new labour force was required. To meet immediate requirements children were recruited from the workhouses, and worked and lived at the factories. They were therefore completely in the hands of their employers, to whose interest it was to keep the machines working the maximum number of hours per day. Under these conditions 14, 16, and even 18 or 20 hours' work a day were commonly exacted, and in 1800 textile operatives normally worked 90 and 100 hours a week. As a large propor

tion of them were women and children protest was unusual and as late as 1849 a 14 and 16-hour day was common in the English coal mines.

But humanitarian agitation grew and early in the century an Act was passed limiting children's labour in factories to 12 hours a day. The doctrine of *laissez faire* and "free bargaining" however caused considerable opposition to legal interference with the conditions of grown men and women. Trade clubs and societies though made illegal by the Combination Acts of 1799 and 1800 began to increase their influence and when legalised in 1821 they embarked on strike and other action for bettering conditions. In spite of powerful opposition a Ten Hours Act was passed in 1847 by which time there was already considerable agitation led by Robert Owen in favour of an 8 hour day.

The achievement of the latter was very gradual and though many enlightened firms notably in the chemical and printing industries had already introduced the 8 hour day in the eighties it was not until after the World War that the principle was generally recognised in this country. Legislation in specific industries such as coal mining and the retail distributing trades came first. An 8 Hours Bill was defeated in Parliament in 1919 but the increasing political power of trade unions and labour movements succeeded in obtaining a legal 8-hour standard in France Germany Czechoslovakia Belgium Switzerland and other countries between 1919 and 1921 and the standard was suggested as an international one in the Peace Treaties.

Meanwhile changing theories of labour and production were influencing the situation. Towards the end of the 19th cent it was already realised that decreased hours might mean increased efficiency and even increased output. In America where legalisation came slowly and hours were left to individual bargaining good progress was made in

various efficient and prosperous industries towards a 5-day 40 hour week. Great differences however exist between State and State hours ranging from 40 to 60. In 1908 Ford's Motor Works instituted a 40 hour week and in 1908 a quarter of a million workers were so employed in the United States. The introduction of the shift system as used in the English coal mines made possible the most economic use of machinery without interfering with the leisure of the workers.

In post War years the increasing efficiency of machinery and its throwing of large numbers of workers into permanent unemployment has rendered the hours problem most acute. In the United States output per person employed in manufacture rose by nearly 50 per cent between 1919 and 1927. The question was no longer entirely a humanitarian one but also one of economic adjustment to changing conditions. The total output of industry could be produced by a small proportion of available labour working long hours. Some theorists have calculated that the introduction of the 4 hour day coupled with widest use of technical improvements would not only maintain but greatly raise our present living standard. In 1932 the Unemployment Committee of the International Labour Office passed a resolution recommending where possible the reduction of hours per day or preferably of days per week worked in order to encourage re-employment and in 1933 in the United States reduction of hours of labour was in the forefront of the remedies for the depression proposed by President Roosevelt.

House, Edward Mandell (b. 1858) American diplomat and statesman. He had an intimate knowledge of politics and exercised his influence in turning the scales in favour of Wilson's nomination in 1912, remaining the President's chief adviser after refusing a position in the Cabinet. In 1914 Wilson sent him to Europe to investigate the causes of the growing dis-

trust between the Powers with a view to avoiding an outbreak of war among the nations. He returned to Europe as peace-seeker in 1915 and again in 1917, later becoming a member of the Allied Council which arranged the Armistice, and representing his country at the Peace Conference. When the Covenant of the League of Nations came to be drawn up, House took a prominent part in its preparation. Details of the life of this influential, but unofficial, diplomat are given in *The Intimate Papers of Colonel House*, by Charles Seymour (1926-8).

Houseboat, a house, or superstructure with one or more living-rooms, built on a flat-bottomed barge. Houseboats are used in England and the United States for holidaymaking on rivers and lakes, and must usually be towed into position, though some (especially in the latter country) are fitted with propelling motors. In many parts of the East, houseboats are used in large numbers as permanent dwelling-places, owing to overcrowding on the land.

Housebreaking, see BURGLARY.

House Fly, the common small fly (see FLIES) abundant in houses in the hot summer months. It is economically important as a possible infector of human food with various disease-germs, like those of typhoid, which it picks up on its feet or proboscis from decaying organic matter it visits. It lays its eggs in refuse of this kind, stable manure or other excrement being favourite sites.

Household, The Royal, originally the sovereign with his officers of State and servants. In Norman times, the offices of Seneschal, Chamberlain, and Constable, which had carried important administrative duties, became hereditary. The duties of these positions were split, one officer taking the public duties, another the domestic ones. The former became separated from the Royal Household.

The organisation and procedure in the Royal Household is to-day much as it was in those times. The three

provinces of the Household, presided over by the Lord Chamberlain, the Lord Steward, and the Master of the Horse respectively, are *above stairs*, *below stairs*, and *out of doors*. The personnel of the Household was reduced by Queen Victoria, who combined the separate sections for king and queen, and it was reorganised by Edward VII. The principal officers are now the Lord Chamberlain, the Lord Steward, the Master of the Horse, the Treasurer of the Household, the Comptroller of the Household, and the Vice-Chamberlain. There are in addition representatives of the Army, Navy, and Air Force. Besides Their Majesties' Privy Purse of £110,000, the Civil List includes items for the salaries of the Household (£125,800), expenses of the Household (£193,000), and Works (£20,000).

Household Management Organised planning of labour in household duties has become very necessary with the present-day shortage of servants and lowered incomes. Many people, too, prefer running a car to paying extra labour. The use of plain untarnishable cutlery, labour-saving equipment, quick cookers, the correct layout of tables, benches, sink, etc., in the kitchen, and detailed plans of work for everyone enable maximum work to be done in minimum time. To plan duties efficiently is the work of an expert; advice can be secured by giving details of the home, its arrangement, furniture, heating, lighting, hot-water system, ornaments, cutlery and crockery to a bureau conducted by one of the housekeeping magazines.

Household Pests, see PESTS, HOUSEHOLD.

Household Troops, see GUARDS.

Housel (Old English, *hūsel* = "Sacrifice"), a common English name for the Holy Eucharist until the Reformation.

Houseleek, common plant belonging to the stonecrop family which grows on the roofs of cottages. The flowers are purple, the leaves are thick, and contain malic acid.

House Martin. the bird which makes a nest of mud under the eaves and is popularly mistaken for the swallow from which it differs by its white throat and rump and unforked tail. It is a regular summer visitor to Great Britain.

House of Correction. A kind of jail first established under Queen Elizabeth for the confinement of paupers and vagrants refusing to work. In view of the inconvenience and expense of committal to the common jail when it is remote from the place of trial magistrates may commit for safe custody where the assizes or sessions are to be held and offenders sentenced in those courts may be ordered to serve their sentence in any house of correction for the county.

House Planning. It is commonly said that fools build houses for wise men to occupy. This piece of dogmatism like most generalisations is only partially true. Robinson Crusoe would have been a fool if he had not built himself a house on his island. Generally speaking however it is cheaper to buy a house that someone else has built than to build for oneself. Even if a considerable amount of alteration and replanning is necessary to suit the requirements of the new owner the cost of purchase plus the cost of alterations and improvements will still fall short of the outlay on a new house. It is very tempting however for a man with a certain amount of money and clear-cut ideas to order a brand new house for himself planned exactly as he wants it. But he will soon find that he has to face three potential enemies—the architect the builder and the local authorities. The architect may tell him that a certain feature on which he has set his heart is out of keeping the builder that it is impracticable and the local authority that it is forbidden. The architect designs a house to gratify his own æsthetic impulse and he may be inclined to overlook the practical side of the problem. The builder left to himself does not hold with the

idiosyncrasies of any architect and designs a house consisting very largely of passages. The local authority in its zeal for the strict application of the letter of the law indulges its powers of veto to the full.

Having decided however to build a house the owner will presumably select his site. In a temperate or N climate the aspect is of great importance. The main rooms of the house should face S though an artist will of course want a studio with a N light. An E to W orientation is not however objectionable. In the tropics the problem is to escape rather than capture the sun. The style will be a compromise between the owner's own wishes and the architect's predilections.

Although all period houses are in a sense shams some exceedingly charming shams in the Queen Anne and Georgian styles have been built in Great Britain and this phase of English domestic architecture is unrivalled all over the world. In a rainy climate sloping roofs are advisable in a tropical or subtropical climate flat roofs are best. If the owner has a fancy for modern architecture he runs the risk of having to endure sheer ugliness in the name of progress. The advanced modern house depends for effect on a series of rectangular boxes with flat roofs and great expanses of brick or concrete not only unrelieved by ornament (a definitely good point) but almost destitute of windows. Balconies and staircases have solid parapets instead of railings or banisters. There is a chance that these experimental gropings may end in a modern style as sure and distinctive as any in the past. The question of materials depends on local conditions. Houses in the Cotswolds for example will normally be built of Gloucestershire stone and houses in clay districts of brick. Concrete can be made and transported anywhere. In a slate country such as N Wales or the Lake District a red tiled roof is out of place.

The interior planning naturally depends on the size of the owner's house-

hold and on his particular needs. In the days when domestic service was cheap, no one paid much attention to labour-saving appliances. To-day, when so many people have to dispense with servants altogether, labour-saving is of paramount importance. Thus, few modern houses have basements, and appliances which 50 years ago were rare luxuries are now taken for granted. Electric light, artificial heating supplementary to the attractive but troublesome coal fire, hot water, and bathrooms are to-day matters of course. An ideal house will have a private bathroom for every bedroom. The garage is now an integral part of the house instead of being a detached shed or converted coach-house. The kitchen, instead of being a dingy cavern, has become an airy and attractive apartment. In a reasonably large-sized house where there are servants, a servants' sitting-room is desirable. The interior decoration (*qv*) of a house is a separate, though cognate, problem.

Finally, to revert to the question of cost, it must not be forgotten that beauty is no more expensive than ugliness.

Houses of Convocation, *see* CONVOCA-TION.

House Sparrow, name for the common sparrow, distinguishing it from the tree sparrow and hedge sparrow, and derived from the bird's invariable and intimate association with human dwellings and its capacity for maintaining itself even in the heart of populous cities. It was at one time thought that the introduction of motor-traffic, leading to the lessening of horses in the streets, would be followed by a marked diminution in the number of sparrows in the towns, but up to the present time no such result seems to have taken place. The house sparrow is now found in nearly all civilised countries of the world, having been deliberately imported into British colonies and into N America, although it was known to be a pest in Europe.

Housing. It was only after the

Industrial Revolution that the housing of the working class became a specific problem in England to be solved by legislation, the first Housing Act being passed in 1851; thus and subsequent Acts gave local authorities power to improve or clean unhealthy areas. In 1890 the first Act was passed, which enabled them to purchase land and build houses for the working class. Further Acts, dealing with overcrowding and housing, were passed in 1891, 1894, 1900, and 1903, while the Housing and Town Planning Act of 1909 gave local authorities power to lay out plans for land to be used for building purposes.

A revolution in housing was made in 1919, when Dr Addison, Minister of Health, introduced the government scheme giving subsidies to local authorities to encourage the building of small houses. Under this scheme 211,000 houses were built, of an improved type and strictly limited in number to the acre. During the War, the building of houses had almost ceased, but in the 10 years from 1919 more than 1,000,000 houses were built, 721,000 with State assistance and 381,000 without.

Other Housing Acts were passed by Mr Neville Chamberlain, Conservative, and Mr John Wheatley, Labour Minister of Health. In 1933 the housing subsidy was abolished, except for slum-clearing purposes. The Health Ministry called on local authorities to submit plans for wiping out the slums within a few years.

From 1855 to 1889 in London the Metropolitan Board of Works dealt with the question of insanitary houses, and with the formation of the London County Council its powers were transferred to this body. Owing to the fact that building was practically entirely in private hands, as a profit-making investment, the supply of working-class houses was beginning to be short in England even before the World War, as it was becoming impossible to build them to let at economic rents. The following figures

show the action taken by the L.C.C. to deal with the shortage

Houses and Flats E. etc.

1912-13	238
1913-14	2 6
1914-15	232
1919-20	6
1920-1	279
1921-2	1 00
1922-3	217
1923-4	227
1924-5	1600
1925-6	2250
1926-7	2207
1927-8	2201
1928-9	2763
1929-30	2144
1930-1	2945
1931-2	2771

The biggest L.C.C. estates are Downham Dagenham Becontree Watling and St Helier

With regard to the provinces of England as early as the forties of the last century the housing position was very bad back-to-back houses courts with no through ventilation and complete lack of drainage and individual water supply being common

The situation in the industrial towns still leaves much to be desired. Although considerable constructional work has been done by Councils throughout Great Britain yet thousands of houses built are not nearly enough to meet the demand and the question of an economic rent has yet to be solved satisfactorily

While in Great Britain the main constructional form for working-class houses is the cottage type with a ground and upper floor on the Continent flats are in favour. Outstanding in post War building are the flats built by the Vienna Municipality to be let at rents within reach of a worker's pocket. In Germany and Holland much has been done by municipalities to help the housing problem both by building new houses and reconditoning old ones

In the U.S.A. there are no State housing plans and the system in operation there has been for people in need of houses when they had a little capital to buy a piece of ground on the hire purchase system, and then borrow the money to build a house

In the U.S.S.R. (Russia) all building is State-controlled. There is an enormous leeway to make up as in the first place the pre War standard of housing for the working class was very low and in the second place so much destruction was brought about by the Civil War

Consult *Housing and the Nation* (1926)

Housman, Alfred Edward (b 1859) English poet is best known for his cycle of lyrics *A Shropshire Lad* (1896). These poems are close to life in style and substance and are marked by a melancholy simplicity of tone. They have deeply influenced modern poets. Housman's other works include *Last Poems* (1929) and editions of *Mantuan* (1903-30) *Juvenal* (1905) and *Lucan* (1906). He is a brother of Laurence Housman (q.v.)

Housman, Laurence (b 1865) English author and artist illustrated works by Meredith Shelley Christina Rossetti and himself. His works include poems short stories and novels. He is best known for his *Little Plays of St Francis* (1922 and 1931) *Followers of St Francis* (1925) and *Communion of Juniper* (1926). His one act plays deal in a charming manner with the sayings and doings of St Francis of Assisi and his friars. His works are often mystical and allegorical

Houston, Dame Fanny widow of Sir R. Houston and one of the wealthiest women in England. She was created D.B.F. in 1917 for her War service. She has made many charitable gifts and many patriotic ones including £100,000 towards the cost of defending the Schneider trophy in 1931. Her offer of £200,000 for national defence in 1932 was declined by the Chancellor of the Exchequer. She financed the successful aerial flights over Mount Everest (1933) and helped the British Museum to purchase Sir Ronald Ross's MSS. She married (1) 1883 Sir Theodore Brinckman (whom she divorced 1895) (2) 1901 the 9th Lord Byron (d 1917) and (3) 1924 Sir Robert Houston

(d 1926) At his death a dispute arose over death duties, which Lady Houston settled by paying the Chancellor one and a half million pounds as "an act of grace"

Houston, Samuel (1793-1863). American soldier and politician. From 1813 to 1818 he served in the Army, then took up law, and in 1827 was elected Governor of Tennessee. In 1829 he moved to Arkansas, living among the Cherokee Indians, with whom he had associated in his youth, and supporting their cause. He led the American colonists in the Texan War, defeating the Mexicans in 1836, and gaining independence for Texas, of which he became president. After it joined the United States, he became its representative on the Senate. He was made Governor of Texas in 1859, but was dismissed in 1861 for opposing his State's secession from the Union.

Houston, a city, port, and railway centre of Texas, U.S.A. There are large oil refineries and railway carriage works. Cotton and rice in considerable quantities are exported. Pop (1930) 202,352.

Hover Fly, the name for a large number of large or medium-sized flies (*q v*) frequently banded like wasps or bumble-bees, and well known for their darting flight and habit of hovering in the air. The flies themselves are mostly flower-feeders, but the diet of the larvæ is varied. Economically the most important are the species whose larvæ feed on green-fly and related plant pests. They have proved especially beneficial in the protection of the vine in many parts of the world.

Howard, the name of the English Catholic family, headed by the Duke of Norfolk, the premier Duke and hereditary Earl Marshal of England. In the 13th cent. William Howard or Haward was made Justice of the Common Pleas. His son became Sir John Howard, Sheriff of Norfolk, and his grandson, also Sir John Howard, served Edward III as an admiral in the Navy. In 1483, the dukedom of Norfolk was conferred on John Howard, who

was killed at the battle of Bosworth. He and his son, the Earl of Surrey, were attainted by Parliament, but the latter, after leading the English at Flodden, won back the dukedom in 1511. The 4th Duke was beheaded for complicity with Mary, Queen of Scots, and his son, Philip, Earl of Arundel, was imprisoned in the Tower, where he died in 1595. The dukedom was eventually restored by Charles II. The present duke (b 1908), is the 16th holder of the title. Other members of the Howard family include the Earls of Carlisle, Effingham, Suffolk and Berkshire, and Wicklow.

Howard, Catherine (c 1520-1542), the fifth wife of Henry VIII, daughter of Lord Edmund Howard, whose father was the 2nd Duke of Norfolk. She was married to Henry after his divorce from Anne of Cleves (1540). In 1542 she was beheaded for infidelity.

Howard, John (1726-1790), English philanthropist and prison reformer. As High Sheriff of Bedford (appointed 1773) his attention was first drawn to the deplorable conditions then prevailing in prisons. He was directly responsible for many reforms in the English prison system, and in 1775 extended his investigations to the prisons of Europe. Two years later, his *State of the Prisons in England and Wales* appeared, and resulted in the adoption of the system in which industrial employment is allotted to prisoners. He died of camp fever contracted in Russia while investigating the hospitals in that country.

Howard, Sir Robert (1626-1698), English playwright, and brother-in-law of Dryden. His political comedy, *The Committee or the Faithful Irishman* (1663), revealed a certain power of characterisation, but a stilted tragedy, *The Indian Queen* (1664), which he wrote with Dryden's aid, relied for its popularity upon its spectacular production.

Howard of Effingham, William Howard, 1st Baron (c 1511-1573), English Lord High Admiral, son of the 2nd Duke of Norfolk. He was ap-

pointed Governor of Calais (1555) and was created baron in 1554. His more famous son Charles (1536-1641) the 2nd baron, also Lord High Admiral, commanded the British naval forces against the Spanish Armada (1588) in 1588. He was created Earl of Nottingham in 1696.

Howe Elias (1819-1887) American sewing machine inventor. At the age of 16 he entered a cotton machinery factory where he conceived the idea of a sewing machine for which he took out a patent in 1846.

Howe Julia Ward (1819-1910) American philanthropist and poetess famous as the authoress of *The Battle Hymn of the Republic* (1861), a leader of the American suffragette movement and the first woman to be elected to the American Academy of Arts and Letters.

Howe Richard Howe Earl (1731-1799) English admiral. He distinguished himself in fighting against the French during the Seven Years War. During the American War of Independence he outwitted a French fleet at Sandy Hook and later relieved Gibraltar (1782). From 1783 to 1788 he was First Lord of the Admiralty. In 1794 he won his famous victory off Ushant—that of the Glorious First of June.

Howells, William Dean (1837-1920) American author of poems, critical reviews and novels including *The Lady of the Arctostaphylos* (1883), *The Minister's Charge* (1886) and *The Landlord at the Lion's Head* (1897).

Howitzer see **ARTILLERY**

Howth (HOATH) a seaside town and summer resort near Dublin. Irish Free State was the scene of Volunteer gun running in 1914. The population chiefly engaged in fishing numbered in 1923 4000.

Hradec Králové (Ger. Königgrätz) a town in N. Czechoslovakia at the confluence of the Elbe and the Adler. Its industries are tanning, soap, candles, pianos and some engineering. There are two buildings of note: an early 14th-cent. Gothic cathedral and the municipal museum. The decisive

battle of Königgrätz or Sadova was fought here between the Austrians and Prussians (1866), the latter emerging victorious. Pop. 1780.

Hsüan Tsang (c. 600-661) Chinese Buddhist monk journeyed to India across the Gobi Desert and Turkistan and witnessed Buddhist festivals in India.

Huang Ho see **HWANG HO**

Hubay Eugene de (b. 1878) Hungarian composer and professor of violin, born at Budapest. Has written operas and orchestral works and taught Sziget, the famous violinist.

Hubert, St. (d. 727) Bishop of Liège and patron saint of huntsmen (festival Nov. 3). Before his conversion he was an enthusiastic hunter and a legend relates that encountering a stag on Good Friday he saw a cross between the animal's horns which he interpreted to be a sign from heaven.

Huc, Évariste Régis (1813-1860) French explorer and missionary went to China in 1839. After a ministry in Mongolia among Chinese Christians he set out in 1841 on an expedition to Tibet which he reached after a year's privation and distress. After 9 months he went on to Lhasa but soon returned to Canton where he ministered for 3 years before returning to Paris (1850). He is especially remembered for his book *Souvenirs d'un voyage dans la Tartarie, le Tibet et la Chine* (1846) which has been translated into English.

Huckleberry an American word probably corrupted from the English whortleberry (i.e. bilberry) but applied in America to the genus *Gaylussacia* of the hatter family. There are several species the fruits of all of which resemble the English bilberry (*Vaccinium*).

Huddersfield, county borough in W. Riding of Yorkshire. Its chief manufactures are cloths and woollen goods and there are large iron engineering and dye works. It is situated near an extensive coal field and is well served by railways and canals. Buildings of note are the Cloth Hall,

art gallery, and technical college
Pop (1931) 113,467

Hudson, Henry (d 1611), English navigator, sent in 1607 by the Muscovy Company to find a passage via the North Pole to the "islands of spicery" the Dutch East Indies. The quest failed, though he sailed back and forth along the ice barrier. In 1608 he set out to discover a passage by the N.E., surveying a great deal of N. America as he went. Hudson Bay and the Hudson R. bear his name, though actually he did not discover either. In 1610, in the *Discovery*, he sailed from London to find the N.W. Passage and, entering "a labyrinth without end," made preparations to winter. Provisions ran short and game was scanty. The crew became mutinous and accused Hudson of showing favouritism in dividing rations. In trying to restore order by deposing the mate, he chose a more mutinous sailor in his place. On June 23, 1611, the ship broke from the ice, but Hudson, his son John, and others were turned adrift in an open boat. The mutineers arrived safely in England, where they were imprisoned, of the deserted men no trace was ever found.

Hudson, William Henry (1841-1922), English author and naturalist, spent his early years in S. America, memories of which influenced much of his work. His books include *The Purple Land* (1885), *Green Mansions* (1904), *Afoot in England* (1909), and *British Birds* (1895). The Hyde Park bird-sanctuary (opened 1925), containing the famous figure of *Rima* by Epstein, commemorates his work for the protection of birds.

Hudson Bay, a huge inland sea, N.E. Canada, ice-bound for 8 months of the year. It is c 1310 m long and 595 m broad, and no fewer than 7 rivers flow into it. From the Arctic it is reached by Fury and Hecla Strait and Foxe Channel. The bay is named after Henry Hudson (qv). Area, c 450,000 sq m.

Hudson River, in New York State,

U.S.A., rises in the Adirondack Mountains, and empties itself into the Atlantic, after flowing c 315 m to New York Bay. For 159 m it is both navigable and tidal, and affords means of communication between New York and various lakes.

Hudson's Bay Company, a chartered company of merchants trading with the Indians of Canada, formed by Prince Rupert and some other noblemen, under a charter granted by Charles II in 1670, for the purpose of importing furs into England. They received a monopoly over the lands around Hudson Bay. Profits were considerable, and increased rapidly when the territory came under the government of Canada in 1869.

Hue, the capital of Annam, French Indo-China. Its main industries are ivory-working and glass-manufacture. Hue is connected by railway with Hanoi (N) and Tourane (S). The town is strongly fortified. Pop 50,000.

Hue and Cry. Old mode of pursuing felons, it may be raised by constables or private persons. A constable taking part in the pursuit has the same powers as if he were acting under a warrant, and all persons who join in a hue and cry are justified in seizing the person pursued, even though he turns out to be innocent. See also ARREST.

Hueffer, Ford Madox, see FORD, FORD MADOX.

Huelva: (1) A province on the Portuguese frontier, S.W. Spain. Area, 3,900 sq m. There are rich deposits of iron, copper, manganese, and phosphates, and extensive vineyards and orchards in the centre and S. Pop (1931) 357,520. (2) Capital of (1), headquarters of sardine and tunny fishing. There is a large export of copper and manganese. Pop 40,000.

Huerta, Victoriano (1854-1916), Mexican soldier and politician. He entered the Army as a youth. In 1902 he suppressed an Indian revolt in Yucatan, and was made brigadier-general. He served under President Diaz and President Madero. In 1912

he became general after a campaign in Chihuahua and in 1913 he commanded Madero's Government troops against Diaz who had revolted but he suddenly deserted and on Madero's assassination was elected provisional President. In 1914 he resigned general feeling being against him and went into exile.

Huesca, a province of N Spain. Agriculture and the timber of the N heights are the mainstay of the province. Minerals are found in small quantities. An interesting town is Monzon where the Catalonian Parliament meets. Fraga, another town was at one period the residence of Aragon kings. Area 5840 sq ro. pop of province c 244 000. The capital of the province is also called Huesca. Pop 14 000.

Hugenberg Alfred (b 1803) German politician, leader of the German National Party, newspaper and film magnate. Came into prominence during the World War as head of the great publishing house of **Sherl**



Dr Hug berg

which issued numerous German newspapers including the *Lokalan 11 rr* as well as controlling the *Telegraph n Union* a widely ramified news service. His undertakings received considerable official support during the World War. After the War he founded the *Ufa* film combine with studios in Berlin and a great distributing organisation. He endeavoured to establish a powerful Conservative party in the post war period but failed. He formed the German National Party which derives its power only through his own influence. He became Minister for Foreign Affairs in June 1932

under the Chancellorship of Von Papen and Crisis Minister (port folio of Economic Affairs and Agriculture in Hitler's first Ministry of Jan 1933) being reappointed to that post in March 1933 after the advent to full power of the National Socialists. He resigned from the Cabinet on June '8 1933 after having circulated a memorandum at the World Economic Conference afterwards repudiated by his Government regarding Germany's territorial ambitions in Eastern Europe.

Hoggins, Sir William (1874-1910) English astronomer born in London. He built his own observatory at *Tulse Hill* London in 1886 where he applied spectroscopic analysis to stellar bodies. He was the first to apply dry plate photography to astronomy taking photographs of bodies not visible even through the most powerful telescopes. By these he proved that nebulae consist of luminous hydrogen gas that comets blaze with incandescent carbon and that calcium under electrical excitation gives lines in the spectrum corresponding with certain forms of stellar light. He measured the heat of certain fixed stars. Huggins became FRS 1865 was knighted in 1897 and received the Order of Merit in 1903.

Hugh, St. (1) Bishop of Lincoln (c 1140-1200) was born at Avalon Burgundy. He helped to found the Carthusian monastery at Witham Somersetshire in the time of Henry II. In 1180 he was appointed to the bishopric of Lincoln and after a life of selflessness and philanthropy died in 1200. He was canonised in 1200. (2) Putative English child martyr (c 1140-1155) who is said to have been starved and crucified by a Lincoln Jew in whose house his body was found. He was buried in Lincoln Cathedral. The incident is referred to by Chaucer in the *Canterbury Tales*. It is one of the many so-called blood libel accusations against Jews later frequently used as an excuse for the massacre and pillage of Jewish communities and the truth

of which has since been denied by the Catholic Church

Hugh Capet (c 910-996), King of France, the first of the Capet dynasty, succeeded to the possessions of his father, Hugh the Great (950), and was elected Frankish king in 987. His reign was disturbed by a rebellion led by Charles of Lorraine, whom he defeated, and by a dispute with the Pope, whose ire he raised by making Gerbert Archbishop of Rheims. *See* CAPET

Hughes, Charles Evans (b 1862), American politician. He took a degree in law in 1884 and began practising in New York. He occupied various chairs in law at Cornell University from 1891 to 1895. He was Governor of New York State from 1907 to 1910, and in 1910 became a judge in the Supreme Court. He was selected as Republican candidate in opposition to Wilson at the Presidential election of 1916, but was defeated after a very close contest. He became Secretary of State under President Harding in 1921, creating a world-wide sensation at the arms conference by suggesting that the U.S.A., Great Britain, and Japan should scrap 60 capital ships and reduce their navies to 500,000 tons to each of the first two, 300,000 tons to Japan, and 175,000 to France and Italy. He assisted also in the ratification of the Four-Power Treaty (1923) between Great Britain, U.S.A., France, and Japan, which related to island possessions in the Pacific and the peaceful settlement of disputes. From 1926 to 1930 he was a Judge of the Permanent Court of International Justice, becoming in the latter year Chief Justice of the United States Supreme Court.

Hughes, Thomas (1822-1896), English author and lawyer, was a friend of F. D. Maurice and Charles Kingsley, succeeding the former as principal of the Working Men's College in Great Ormond Street, London. He is known almost solely for his *Tom Brown's Schooldays* (1857). Other works by him are *Tom Brown at Oxford* (1861) and *The Scouring of the White Horse* (1850).

Hughes, William Morris (b 1864), Australian statesman, of Welsh birth. He emigrated to Australia in 1884, and after organising the Sydney dockers, became a Labour member of the New S. Wales Parliament in 1894. In 1904 he was appointed Minister for External Affairs in the Federal Parliament, and 4 years later became Attorney-General in the Fisher administration, succeeding the latter as Prime Minister in 1915. In 1916, after the rift caused by the conscription question, he headed a Coalition ministry. His experiments in the interest of labour during his term of office met with much opposition, but he withstood all attacks, and remained Prime Minister until 1923, when, after having represented Australia at Versailles in 1919 and at the Imperial Conference in 1921, he resigned, and was succeeded by Bruce. In 1920 he formed the *Australian Party*, which had a short life of 2 years.

Hugo, Victor Marie (1802-1885), French author, greatest of the French romantics. His first volumes of verse, *Odes et Poésies Diverses* (1822), *Odes et Ballades* (1826), and *Les Orientales* (1820), are notable for the metrical skill and colourful diction that characterise all his works. The bizarre subjects of his poems foreshadowed the pronounced romanticism for which he was soon to become celebrated. In the preface to *Cromwell* (1828), a historical drama, Hugo issued his manifesto. He claimed that complete freedom from tradition and perfect individuality were essential to good literature, and in *Hernani* (1830) he put his principles into practice. The unconventional nature of the verse and diction of this play caused a riot on its first night.

Hugo went on to revolutionise prose in *Notre Dame de Paris* (1831). Other historical plays, including *Ruy Blas* (1838), followed, and meanwhile he was publishing numerous volumes of poetry, including *Les Feuilles d'Automne* (1831), *Chants du Cré-*

puscule (1835) and *Les Rayons et les Ombres* (1840). In 1852 he was exiled for his political opinions. During this period *Les Châtiments* (1853) a satire the *Légende des Siècles* (1859) narrative poems and many articles and pamphlets appeared. *Les Misérables* (1861) *Les Travailleurs de la Mer* (1866) and *L'Homme qui Rit* (1869) established his fame as a writer of prose romances. In 1870 he returned to France but of his later works only *L'Art d'être Grand-père* (1877) is well known. Hugo's work was made immortal by his tremendous vitality. The colour and warmth of his prose and the metrical

skill and glowing diction of his poems have never been equalled in any language. He had an enormous influence on all the younger European poets of his day.



V. H. g.

Huguenots name given to the French Protestants from about the middle of the 16th cent. Persecution of the reformers began with an edict of 1535 and went on steadily until the 18th cent. Among the many illustrious exiles was Calvin (qv). The movement however steadily gathered strength and became largely a political movement under the leadership of the Bourbons the Montmorencies and such men as Coligny and Ambrose Paré against whom was ranged the Guise faction. The 16th cent was an era of bitter civil war. Peace was not established until the entry of Henry IV into Paris and the promulgation of the Edict of Nantes in 1688. The accession of Louis XIV marked a renewal of the struggle. The Catholics were everywhere suc-

cessful. In 1685 the Edict was revoked. Some 500,000 inhabitants including many of the most eminent men of France were driven into exile by the unexampled cruelties perpetrated. But the movement was not crushed. It drew strength from the persecutions and hope from the growing spirit of liberalism of the 18th cent. In 1798 civil equality was at last achieved by the Revolution.

Huitlopoctli, the war god and principal deity of the ancient Aztecs of Mexico. He was worshipped with human sacrifices the limbs of which were eaten by his devotees. In the shape of a humming bird he guided the ancestors of the Aztecs to their home.

Hulbert, Jack (b 1891) English actor, dramatist, manager and producer. Educated at Westminster and Caius he made his professional debut under Robert Courtneidge in *The Petal Girl* (1913). He has had many successes including *Clowns in Clover*, *The House that Jack Built Folly to be Wise* and *Follow a Star*. He took up screen work in 1931 and starred in *The Ghost Train*, *Love on Wheels*, *Happy Ever After*, *Jack's the Boy* and *Falling for You*. He married Cicely Courtneidge.

Hull (officially *Ainston upon Hull*) city, seaport and county borough, Yorkshire, situated on the R. Hull where it joins the Humber. There are more than 10 m. of quays the docks covering a water area of 30 acres. Hull is the third port in England. The leading industries are flour-milling, sugar-refining, paper-making, cement, paints, tanning and brewing. The buildings of note are the parish church, city hall, municipal art gallery, Wiltshire Museum, Royal Institution and grammar school. The borough has 4 parliamentary divisions, each returning one member. Pop. (1931) 313,366.

Hull, Cordell (b 1871) American Democratic politician. He was called to the Tennessee Bar in 1891. Member of the Tennessee House of Representa-

tives 1893-7, circuit judge 1903-7, and congressman 1907-21. He became Secretary of State in the Roosevelt administration in 1933, in which year he led the American delegation to the Economic and Monetary Conference in London.

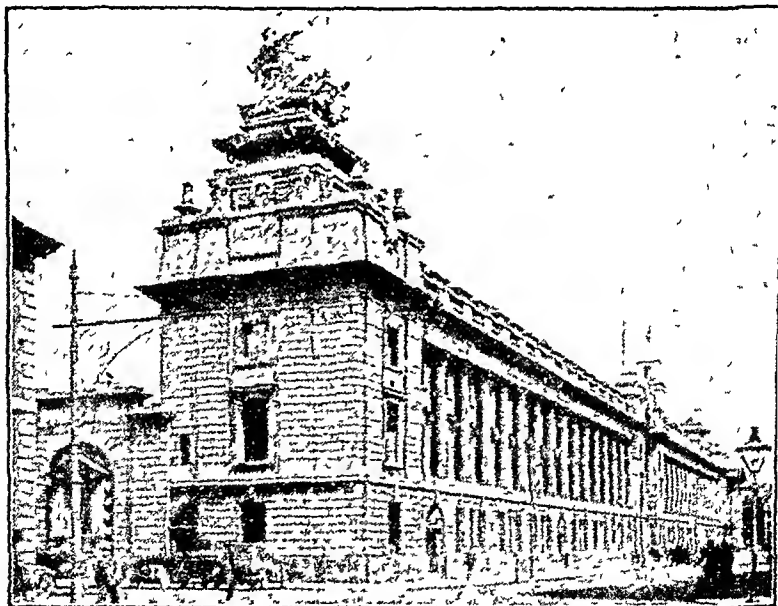
Humane Society, Royal, a society founded in 1774 by Dr William Hawes and Dr Thomas Cogan for the purpose of giving aid and restorative treatment in cases of drowning. A Receiving House was built on the N bank of the Serpentine in Hyde Park in 1794, the first of 280 stations, in all parts of the country, where life-saving apparatus is kept. Medals and other rewards are given by the Society, which is maintained by voluntary subscription, to persons displaying gallantry in life-saving.

Humber, an estuary of the R. Trent and Ouse, on the E coast of

England, dividing Yorkshire and Lincolnshire. The entrance is partially closed by Spurn Head on the N side, forming a bay about 8 miles wide. The ports of Hull and Grimsby are situated on its banks.

Humbert I. (1844-1900), King of Italy, son of Victor Emmanuel I. He married his cousin, Margherita Teresa Giovanna, princess of Savoy (1868), and succeeded to the throne in 1878. In the same year an attempt on his life was made at Naples. A second attempt to assassinate him was made (1897), and in 1900, at Monza, the anarchist Bresci made a third, and successful, attempt. He was called by his subjects Humbert the Good.

Humble Petition and Advice, presented by Parliament to Cromwell in 1657, begging him to be king, but denying his right to interfere with



Guildhall, Hull

parliamentary election or to nominate members of the Upper House without Parliament's consent. Cromwell declined to be king and an amended petition without this clause was presented and accepted.

Humble-bee *see* BUMBLEBEE

Humboldt, Friedrich Heinrich Alexander Baron von (1769-1859) German scientist and traveller. He visited Teneriffe in 1799 where he climbed the Peak and discovered the most beautiful view in the world. He explored the course of the Orinoco in 1800 and the sources of the Amazon in 1802. After 1808 he lived in Paris and Berlin and was given an appointment at the Prussian court. He was sent from Berlin on various diplomatic missions. In 1809 he made a journey through Siberia. Humboldt was the first to use isotherms (q.v.) and he discovered the variable intensity of the magnetic force of the earth. His great work *Kosmos* (1845-62) was planned as a philosophical as well as a topographical description of the world. Either alone or in collaboration with Bonpland, Gay Lussac and others he wrote many other books, most of them accounts of his travels. His elder brother was Karl Wilhelm von Humboldt (q.v.).

Humboldt, Karl Wilhelm von (1769-1835) German philologist and Prussian Minister of Education. He was largely responsible for the founding of Berlin University in 1809. In 1819 he retired to write *Researches into the Asiatic Language* (1811) and *Über den Dualis* (1814) both very valuable. His study of the ancient language of Java was his great life work.

Hume, David (1711-1776) Scots historian and philosopher published his first valuable work *Essays Moral and Political* in 1741. His best known philosophical work *Theory concerning the Principles of Morals* appeared in 1751 and his *Political Discourses* a year later. He failed to obtain academic appointments but became attached to the embassy in Paris (1763) where he was very popular. His longest work, the *History of*

England from James I was published between 1754 and 1761. This was the first history to be concerned with the literary and social as well as political outlook.

His works include many essays on economics, philosophy and psychology—notably his *Treatise*

of Human Nature (1739-40) in which he attempts to formulate a theory of knowledge based on Locke's empiricism.

Humidity *see* ATMOSPHERIC DREW

Humiliati, 11th-cent. Italian monastic order said to have been founded by some Lombard nobles exiled by the emperor Frederick I. Upon their return they took the name of Humiliati (from the simplicity of their habit) resolving to live in humility and purity. Each of the lay brothers comprising the order lived with his own family. There was a second order for women and a third for priests.

Hummel, Johann Nepomuk (1792-1837) German composer and pianist contemporary and friend of Beethoven and pupil of Mozart and Haydn.

Humming bird, a family of birds related to the swifts (q.v.) containing the smallest and in some ways the most beautiful species of the class. Humming birds

are restricted to America and are distinguished by their long slender bills, protrusible tongues,

broad tails and short narrow wings, their structure adapting them to hover over flowers and extract the nectar, upon which, and upon small insects,



DAVID HUME



HUMMINGBIRD

they feed. They are generally decorated with brilliant iridescent patches of ruby, emerald, and sapphire hues.

Humour, in its original meaning, was applied to a psychopathological state. The *humours* of mediæval medicine referred to the preponderance in an individual of one of four physical secretions, and the consequent effect upon that person's general character. Men were thus classified as of sanguine (blood), phlegmatic (phlegm), choleric (gall), or melancholy (bile) humour. Thence the meaning of the word developed, with Ben Jonson, into "ruling passion", and this, by a natural process, was associated with the eccentricities of its individual possessors. From this, the modern use of the word becomes intelligible. It cannot be adequately defined except by comparison and illustration. It is, for example, distinct from wit. Wit is the crystallised judgment of a detached observer laughing at or ridiculing some human quality or act, the humorist laughs with his subject, not excluding himself from the particular incongruity or eccentricity about which he laughs sympathetically. Shakespeare's Falstaff was far more conscious than his hearers of the incongruity of his remarks as uttered by himself, there is not a spark of wit in his "they hate us youth," which is the very essence of humour.

Humour, in fact, consists of the recognition and acceptance of the weaknesses, eccentricities, and incongruities of the human character, and in giving some form of expression to that appreciation in such a way as not to hold oneself excluded as a possible subject to similar humour. In any of its characteristic varieties (Cockney, Irish, American, etc.) it is always recognisable, even if it defies precise definition.

Humperdinck, Englebert (1854-1921), German composer, esp. of the fairy opera *Hänsel und Gretel* (1893). Born near Bonn, Humperdinck studied at the Cologne Conservatoire, and won the Mendelssohn scholarship (1878). He

was connected with the production of *Parsifal* at Bayreuth, and arranged Wagner's works for pianoforte. Humperdinck composed the music for Reinhardt's production of *The Miracle* in 1910.

Humphry, Ozias (1743-1810), English painter, best known for his miniatures. He was born in Moniton, and lived for a time in Bath and later in London. He was a friend of Romney, and travelled with him to Italy. In 1785 he went to India, where he made a number of sketches as well as painting miniatures. R.A., 1791.

Hundred, name of a territorial subdivision of the shire in early England. In the N.E. and the E. Midlands, the divisions were called Wapentakes. The hundred had its court of justice, with jurisdiction in civil cases. This was finally extinguished by the Riot Damage Act, 1886, which placed the liability for damages in riot upon the police rate. The name is still used, e.g. Hundred of Hoo, in Kent. See also CHILTERN HUNDREDS.

Hundred Days, name given to the period March 20-June 28, 1815, between Napoleon's return to Paris after his escape from Elba, and the restoration of the Bourbon dynasty in Louis XVIII.

Hundred Years' War (1338-1453). The possession of French territory by English kings from the days of the Conquest onwards was a frequent cause of Anglo-French conflict, but the series of wars known as the Hundred Years' War was not continuous.

The immediate occasion of the war was the shelter given by Edward III to Robert of Artois, expelled from France by Philip VI. Philip seized the opportunity to declare the English Crown's possessions in France forfeit to the French Crown. Edward retaliated by making a claim to the throne. Charles IV of France had been the last male heir of the Capet kings of France. He had been succeeded by Philip of Valois, to whom Edward had done homage for his French territory. Edward claimed descent through a

daughter of Charles IV. It was dubious under French law by which the crown could not descend to a female whether it could be inherited through a female. But even if it could be the rightful heir would have been Charles of Navarre not Edward III.

The early stages of the war opening in the Low Countries where Edward had numerous allies went against him with the exception of the naval battle of Sluys in 1340 which gave the English control over the seas. In 1346 a revolt against the French king in Brittany gave Edward possession of a few fortresses but no more. In 1346 landing with an army in Normandy Edward won a great victory at Crécy (1346) and the next year captured the strategic port of Calais. Meanwhile at Neville's Cross (1346) the Scottish allies of the French had been defeated and their king taken prisoner.

From 1347 to 1355 a series of truces prevented any general campaign though raids were made to and from the English territories in France. In 1355 war broke out again and English armies penetrated N. and S. France. They were successful in pillage and slaughter and under the Black Prince decisively beat the French at Poitiers (1356) and 4 years later the peace of Breigny (1360) was signed by which Edward gave up his claim to the French throne obtained an indemnity and territory which included nearly half of France S. of the Loire.

These territories were easier to gain than to keep and were lost when in 1369 the war was renewed. In 1372 a French and Spanish fleet defeated the English at La Rochelle but the war dragged on with intervals of truce until in 1395 Richard II made peace at the cost of surrendering all Edward III's gains retaining only Calais and part of Guienne. In 1404 the French invaded Guienne when Henry IV of England was distracted by Glendower's Welsh rising but an outbreak of civil war in France in 1407 put an end to

this war and the English still retained Guienne.

The strife between Orleans and Burgundy for the regency of France during the madness of Charles VI gave Henry V his opportunity. In 1415 he invaded France the Orleanists then in possession of the government attempted to buy him off but he had obtained the promise of Burgundian neutrality and would accept no less than the settlement of 1360. He defeated the French at Agincourt in 1415 and in 1417 the murder of John of Burgundy by the Dauphin so angered the French that they made peace with the English (Treaty of Troyes signed in 1420). Henry V was to marry the Princess Catherine and was to inherit the French throne on the death of Charles VI. Acknowledged as king by the N. of France he was engaged in subduing the S. when he died in 1422. The remaining 30 years is the story of the impoverishment of two realms in the futile attempts of the English to complete Henry V's gains and their expulsion by the reviving French armies under the influence of Joan of Arc. The war ended with the battle of Chatillon (July 17 1453).

Hungarian Language. This is one of the Finno-Ugric (q.v.) family of languages and is known by its speakers as *Magyar* [MA DYAHK]. It is one of the few European languages which are outside the Indo-European family (q.v.). It has an intricate grammatical structure in which suffixes and affixes play a very large part. The vowels have mainly the usual continental values: *e* is pronounced like *ss*, *y* like *y*, *i* like *sh*, *g* always hard and *r* rolled. *cs* = *ch*, *dt* = *d*, *dsz* = *z*, *gy* = *dy*, *sz* = *sh* (as in *leisure*). It is spoken by c. 10 millions in Hungary and c. 500 000 in the U.S.A.

Hungarian Literature did not properly become a national possession before the 18th cent. since the official language was till that time Latin owing to the influence of Catholic Christianity. But from the 15th cent.

onwards there was a certain amount of translation from the Bible, and of rhymed chronicles. The first printed book was the *Budai Krónika* (1473), a history of Hungary. Two 17th-cent poems are noteworthy: the *Zrínyiász*, a national epic by Nicholas Zrínyi, and the *Venus of Murány* of Stephen Gyöngyössi. In the 18th cent, prior to the general revival of the national literature, Francis Faludi was pre-eminent in both prose and verse.

The great revival of the language and literature came at the end of the 18th and the beginning of the 19th cents. Bessenyei, Virag, and Kisfaludy early in the 19th cent, are representative of the classical school of poetry. Later in the century came Miciaci Vörösmarty, who translated much of Shakespeare and was the author of lyric and epic poems, Petöfi, the lyricist, and Arany, the epic poet. The chief novelists of this century were Baron Nicholas Josika and Maurus Jokai. Charles Kisfaludy, the brother of the poet of *Himfy*, was one of the creators of the modern Hungarian drama, which has flourished vigorously in the work of Szigheti, Toth, and Döcz among many others.

Pre-War 20th-cent literature is notable for the swan-songs of the poets, Lévy and Endrödi, the later novels of Koloman Mikszath, and the appearance of a younger generation of authors which included the poet André Ady and the realistic novelist Sigismund Móricz. Since the World War, Hungarian literature has expressed itself chiefly through the medium of the novel, in which form it has produced not a few works of the highest excellence.

Fr Ricdl's *A History of Hungarian Literature* covers the subject well up to the date of its publication (1906), but there does not appear to be any outstanding work in English dealing with the more modern literature.

Hungarian War of Independence, fought between the Hungarians and Austria and her allies, after Hungary had declared her independence in 1849.

By the revolution of 1848 Hungary had obtained autonomy under the rule of the Habsburgs. The Emperor was able to set Magyars against Croats and Slavs, and Jellačić, in command of Croatian troops, was ordered to reconquer Hungary, which was placed under martial law in Oct 1848. He was defeated. The Austrian army under Prince Windischgrätz entered Hungary and won the battle of Kápolna (Feb 1849). Under the command of Görgei, an able soldier, the Magyars won a series of victories, and Hungary was proclaimed an independent republic. The Russians offered aid to the Austrians, which was accepted. An Austrian army under Count Haynau from the W, and a Russian army from the E, attacked Hungary. The Hungarians, divided and without plans, were defeated, and Görgei, who had been appointed dictator, surrendered. Kossuth, the soul of the independence movement, escaped to Turkey, but Batthyány, his colleague, was tried and shot, with many others.

Hungary, a Central European kingdom of the Danubian plain, formerly part of the Austro-Hungarian monarchy. It is completely landlocked, lying between the Austrian Alps on the W, the Czechoslovakian Carpathians on the N, the Rumanian province of Transylvania on the E, and Yugoslavia on the S. Area, 35,886 sq m. For the most part it is flat, save where a spur of the Alps extends through the Bakony Forest, reaching a maximum height of 2340 ft, and the N highlands continue the line to 3315 ft. It is watered by two important rivers, the Danube and the Theiss, which run parallel from N. to S., while in the W is the important inland sea of Balaton (q.v.), and on the Austrian frontier the Neusiedlersee. On the N.W. is the Little Hungarian Plain (Kis-Alföld), with rich crops of wheat and sugar-beet, separated from the Great Plain (Nagy-Alföld) by forested hills and the R. Danube. In the S. also the fertile loess and loam enables

large crops of wheat to be cultivated while in the E is the wide Hortobágy or uncultivated grassland where great numbers of cattle and horses are raised. Rye and maize are grown on the sandy soils and the vineyards of Balaton Szekszárd Pecs Villány and Tokaj produce fine wines. Tobacco flax hemp rope hops peas lentils and beans are also raised while the chief fruits are apricots apples plums cherries peaches and pears. The country is predominantly agricultural. In addition there are 4300 sq miles of forest land of which 84 per cent consist of oak and beech. Live stock includes pigs cattle sheep and horses.

The population (1930) is 8 688 300 of whom 90 per cent are of Magyar speech 7 per cent German and per cent Slovak 64 per cent are Roman Catholics 7 per cent Protestants 5½ per cent Jews and 2½ per cent Greek Catholics. The Magyar language which belongs to the Finno-Ugrian group is agglutinative and lacks grammatical gender. Education is compulsory from the age of 5 and consists of elementary and either higher or technical courses. There are 4 universities—at Budapest Szeged Debrecen and Pecs the latter which was founded in 1367 being one of the oldest in Europe.

Government is by an assembly of two chambers—the House of Magnates and the Commons—the members of the lower house being elected by secret ballot in the towns and by oral vote in rural districts. Franchise extends to all men over 24 and women over 30 who have attained certain educational standards. Hungary, although nominally a kingdom has no king. Admiral Horthy at present acting as Regent, a position which he has occupied since Béla Kun's Communist régime was overthrown in 1919. Administratively the country is divided into 14 counties with local government. By the Treaty of Trianon the Army is limited to 30 000 while Air forces are completely

in of railways mostly State-owned and 16 900 m of road.

Hungary has suffered greatly in recent years both in its internal finances and in its foreign trade from the steady decline in the price of the agricultural products which are its main support and from the high tariff walls by which the neighbouring countries try to exclude them. Two hundred and fifty four million gold krona were raised under the auspices of the League of Nations for a reconstruction programme beginning in 1924-5. So successful was the reorganisation that the greater part of the loan was allotted to productive economic development instead of to budgetary balancing. Exports are chiefly animals poultry wheat flour and electrical machinery. Imports are timber coal textile fabrics cotton paper and machinery.

History. The Roman rule in Hungary (Pannonia) and Rumania (Dacia) was followed successively by that of the Germans Huns under Attila Goths Lombards and Avars the latter being defeated by Charlemagne. In 896 the Magyars arrived at the mouth of the Danube from Central Asia via the Russian steppes and in 896 settled in Hungary under Arpád. After ravaging Central Europe they fell back to their headquarters and accepted Western Christianity in the 10th cent. In 1001 Stephen was granted a Crown by the Pope and the independence of Hungary was recognised. Stephen's reforms were however followed by a series of invasions both from nomad tribes on the E and from the Holy Roman Emperor on the W.

The Tartar invasions of 1241-2 proved a severe shock and the Arpáds grew weaker to be succeeded in 1387 by the House of Luxembourg under whom Hungary joined the Holy Roman Empire. Under Louis the Great Poland was added to Hungary and the country extended from the Adriatic to the North Sea and the Dnieper. Meanwhile the Turks were advancing through the Balkans and in spite of

the external victories of John Hunyadi, who led the Christian League in the middle of the 15th cent., and the internal reforms of Matthias Corvinus, the Hungarians were disastrously defeated at Mohacs in 1526. Fifteen years later Buda fell and Hungary came under Turkish rule, the Magyar centre moving to Transylvania, and with the Reformation becoming solidly Protestant. Fifteen years of war in the latter half of the 17th cent., following a raid by Count Tököli, drove out the Turks once more and placed Hungary under the Emperor. A rebellion against the latter was led by Rakoczy, but was crushed.

During the 18th cent the central plain became thoroughly Magyarised and consolidated as a compact State, while Maria Theresa, during her period of power, greatly improved the conditions of the people. In the early 19th cent the renaissance of Hungarian nationalism, combined with Liberal tendencies under Kossuth and his friends, culminated in the revolution of 1848. This provoked the S. Slavs under Jellacic to revolt in support of the Emperor, and Windischgrätz was sent by the latter to demand the absolute submission of the Hungarians. The War of Independence followed, in which Austria, with the aid of Russia, was enabled to hold down the Magyars. In 1867 the victors agreed to the Compromise or Ausgleich, under which Austria and Hungary enjoyed equal rights of separate self-government under a single Emperor. The period before the World War was marked by the agitation of the Slav minorities, and when the strain of the World War began to tell, the ill-assorted and un cemented empire moved inevitably towards dissolution.

On Nov. 13, 1918, a Hungarian People's Republic was formed, which fell to the Communists under Bela Kun in the following March. This move was answered by the invasion of the Czechs and Rumanians, the latter of whom occupied Budapest on August 4, after the flight of Kun. Four Allied Generals

sat as Commissioners, and a reactionary Government instituted the "White Terror." The latter was also forced to accept the Treaty of Trianon, by which Hungary lost two-thirds of its pre-War area and over a half of its population, as well as 88 per cent of its forests, 61 per cent of its arable land, 37 per cent of its vineyards, and 55 per cent of its factories, to the other succession countries. Horthy was elected Regent, order restored, and the present régime entered upon with the Bethlen Cabinet of 1921.

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Huns, a name given to several nomadic tribes in the early part of the Christian era. They swept into the Roman Empire, already disorganised by previous barbarian invasions. Under Attila the Huns formed a barbarian kingdom of wide extent, threatening the complete downfall of the Roman Empire. In 446 Attila penetrated as far as Constantinople, he died in 453, and the year following saw the complete defeat of the Huns by several Germanic tribes, such as the Goths. The name is also given to the Magyars, who invaded the district now called Hungary in the 9th cent. A.D. It is also given to the Hūnas, who invaded India at the beginning of the 5th cent., and the White Huns, who attacked Persia at the same period. They were probably all of Mongol extraction.

Hunt, James Henry Leigh (1784-1859), English essayist and poet, became Editor of the *Examiner* in 1808. His *Poetical Works* include the *Story of Rimini* (1816), one of the first "romantic" works, which shows the influence of Chaucer and Spenser; *Hero and Leander*; and *The Descent of Liberty*. He was a friend of Thomas Moore, Byron, Shelley, and Keats, but his verse never approaches theirs in

quality. His best works are the essays which he contributed to the *Examiner Indicator* and *Companion* on literary and other subjects and his *Autobiography* (1850). He was caricatured by Dickens as Mr Skimpole in *Bleak House*.

Hunt, William Holman (1827-1910) English painter born in London where he was placed in an office at the age of 12. He displayed a far greater interest in art than in business and at the age of 16 began to study at the Academy School. Three years later he first appeared at the Royal Academy exhibition with a picture called *Mark I*. In his student days he formed a great friendship with the young Millais and in 1848 the two young men together with D. G. Rossetti, Ford Madox Brown and others formed the Pre-Raphaelite Brotherhood. Hunt's painting of *Pseus* in the Academy of 1849 showed the effect on his work of the new doctrines to which he remained faithful throughout his career.

Always keenly interested in scriptural subjects, Hunt undertook a pilgrimage to Syria and Palestine in 1854 in order to be able to treat truthfully his biblical backgrounds. His *Scapegoat* and other Eastern paintings were shown in 1856. Among other paintings of Hunt's which must be mentioned is his *Light of the World*, the original of which painted in 1854 is now at Keble College, Oxford. He produced a replica in 1904 now in St. Paul's Cathedral. A smaller replica is in the City Art Gallery in Manchester. This painting illustrating the passage from Rev. iii. 20 beginning 'Behold I stand at the door and knock' is a good example of Hunt's desire to use his work as a medium for the exposition of Christian teaching. Further such examples are *The Shadow of Death* in Manchester and the two versions of the *Triumph of the Innocents* in Birmingham and Liverpool.

Hunt's *Pre-Raphaelitism and the Pre-Raphaelite Brotherhood* (1905) is an authoritative and interesting account of the aims of the movement of which he

was so ardent an adherent. Hunt was a member of the Order of Merit and was buried in St. Paul's Cathedral.

Hunter John (1798-1793) British surgeon and anatomist. In his youth he was a cabinet maker in Glasgow but came to London and studied surgery. He became house surgeon at St. George's Hospital in 1798 and after accompanying expeditions abroad began private practice in 1803. He was elected F.R.S. in 1807 and appointed surgeon extraordinary by George III in 1816. In 1845 he built an anatomical museum in Leicester Square and was made Surgeon General in 1790. His remains were removed from St. Martin in the Fields to Westminster Abbey in 1859. Hunter was an authority on all biological science. His principal works were *On the Venereal Disease* (1780), *Observations on certain parts of the Animal Economy* (1785), *Treatise on the Blood, Inflammation and Gunshot Wounds* (1794), *Observations and Reflections on Geology* (1800) and *Memoirs on Legislation* (1800). His valuable collection is in the Royal College of Surgeons which has established a Hunterian Professorship.

Hunter William (1718-1783) British anatomist. He became well known as a lecturer on medicine and in 1764 was appointed physician extraordinary to Queen Charlotte becoming an F.R.S. in 1767. He founded an anatomical museum (now in Glasgow University) to which was attached a classical library. His most important work is on the *Anatomy of the Gravid Uterus* (1774).

Hunting the pursuit of wild game usually with the aid of dogs is a necessity of life among primitive peoples below the pastoral or agricultural stage of culture and is generally retained as a sport among civilised communities. The ancient Egyptians, Assyrians and Persians were great hunters and the sport was also popular among the Greeks and Romans. During the Middle Ages kings and nobles were ardent devotees of the

chase, and to ensure an abundance of game, forest and game laws were enforced with the utmost severity. The wolf and wild boar were once hunted in Britain, but to-day the quarry is confined to red and fallow deer, the fox, and hare, and the otter.

Fox-hunting, now regarded as hunting *par excellence*, did not begin to assume its present prominence until the middle of the 18th cent., when packs first began to be kept exclusively for the pursuit of the fox. The season lasts from Nov to March, but *cub-hunting* begins in Sept. Foxhound packs are to be found in all parts of the

usually owned the pack, but to-day many hunts are run by syndicates, by whom the Master is appointed.

Stag-hunting, the pursuit of the wild red deer, formerly the most esteemed of all beasts of the chase, is now in England mainly confined to Exmoor and the Quantocks, the most famous packs being the Devon and Somerset, and the Quantock. The modern stag-hound resembles a foxhound, but is larger and more powerful. The stag-hunting season begins c Aug 10, and ends c Oct 10. Hind-hunting then begins and continues till April.

Buck-hunting. The fallow deer, or buck, is hunted in many parts of England with staghounds. The Royal Buckhounds, formerly kennelled at Ascot and hunted by the Master of the Buckhounds, were abolished in 1901, and succeeded by the Bucks and Berks staghounds. Where deer are not plentiful, it is often the custom to use "carted" deer. The quarry is taken in a cart to the "meet," and there loosed. After a sufficient interval hounds are laid on, but the stag is not killed, as when it is brought "to bay" the hounds are whipped off, and the stag returned to the cart.

Hare-hunting. The hare is hunted either mounted, with harriers, a smaller type of foxhound, or on foot, with beagles, a small slow-running hound with great powers of scent. The hare nearly always runs in a circle, and by skilful use of the ground the sport may be followed without excessive exertion.

Otter-hunting. The otter is followed on foot, and when viewed may be speared by any member of the "field" within distance. For successful otter-hunting the water should not be too low or the otter is likely to be killed too quickly, or too high, in which case he is usually impossible to find. True otter hounds resemble shaggy harriers, but as the sport is followed in spring and summer, when there is no other hunting, foxhounds are often used for the purpose.

Wolves and wild boars are still hunted in some parts of Europe,



Meet of the Wharfedale Chase Hunt, near Aylesbury, Bucks

country, but the most famous hunting district is that known as the "Shires," a rather vague term embracing Leicester, Rutland, and Northants, and including the Belvoir Hunt in Lincolnshire, as well as the Cottesmore, Quorn, and Pychley. Among the fells of the Lake District, the country of the famous John Peel, foxhounds are followed on foot. Packs vary from the 75 couples necessary for hunting 5 or 6 days a week, to 25-30 couples, sufficient for 2 days a week. A pack is under the control of a Master, assisted by a huntsman and 2 whippers-in. An earth-stopper is often also employed. Formerly the Master

especially S France and Germany and in Austria. In India and Africa jackals and hyenas sometimes take the place of the fox and are said to give good sport. In N India the cheetah or hunting leopard is employed to run down antelopes and small deer.

Hunting (engineering) term for a form of disorganised action of self-regulating mechanism such as the governor of an engine and the electric regulation of an alternating-current dynamo. In all such systems regulation is effected through a governor which responds to small changes in whatever is to be controlled by bringing about some effect tending to oppose the change. When the governor is over sensitive as compared with the speed with which the system responds to its action it overdoes its regulation. When this over-effect is felt by the governor it overdoes regulation in the opposite direction. All such governing depends upon small oscillations but when hunting occurs these become greater and greater.

Hunting-dog (or *Hyena dog*) a large wild dog found in tropical and S Africa and distinguished by its tortoise-shell colour, its large expanded erect ears and by the absence of the dew claw on the fore feet as in Hyenas (qv). These dogs hunt in packs fed mainly on antelopes and fearlessly attack species even as formidable as the sable antelope.

Huntingdon, county town of Huntingdonshire situated on the N bank of the R Ouse. It was the birth place of Oliver Cromwell. There are two breweries, a flour and saw mill, timber yard and motor works. Notable buildings are the Court Hall, the Cromwell House (once the site of a Augustinian Friary), the Hospital of St John and the courtyard of the George Hotel. The Grammar School where Cromwell and Pepys were educated dates from the 13th cent. Pop (1931) 4108.

Huntingdonshire S Midland county of England bounded N by the Nene

or Ner and traversed towards the S by the Ouse. Area 388 sq m. There are nearly 50,000 acres of fen land. Agriculture has always been the staple industry, wheat being the principal crop. There are no towns with a population over 5,000. The county town is Huntingdon (qv). St Ives, Buckden, where Catherine of Aragon spent part of the last two years of her life and Godmanchester with its half-timbered houses are picturesque places. Pop (1931) 56,704.

Hunyadi, János or John (c 1387-1456) famous Hungarian soldier was born in Transylvania. He fought under King Sigismund in the Hussite War and later against the Turks. His victories over the latter army include those of Szendrő (1441) and the Iron Gates (1441). He was made regent (1446) and was defeated by the Turks at Kosovo (1448). In 1456 however he conquered their fleet and forced the Turkish troops to abandon the siege of Belgrade. This victory secured Hungarian independence for another 70 years but Hunyadi died of plague 3 weeks later. Hunyadi's generalship was far in advance of his time. He was the first to use a regular army on a large scale and to rely on strategy rather than on brute strength and courage.

Huon Pine, evergreen coniferous tree (*Dacrydium Frankii*) not a true pine, growing in Tasmania generally 60-80 ft. but sometimes 100 ft. high. It is remarkable for the beauty of its wood which is yellowish and marked with beautiful wavy lines and knots. The wood takes a good polish and is used for cabinet making.

Hubei, a province of Central China watered by the Yangtze Kiang. Area 71,420 sq m. most of which is under tea, wheat, cotton and rice cultivation. In the less flat districts are coal mines. The capital is Wuchang. Pop of province c 28,810,700.

Huron, Lake one of the Great Lakes in N America covering an area of 22,800 sq m. and forming part of the

boundary between Canada and the U.S.A. See also GREAT LAKES

Hurricane, see WINDS

Huskisson, William (1770-1830), English statesman, Under-Secretary for War (1795), and Secretary to the Treasury (1804-5 and 1807-9). He was appointed President of the Board of Trade (1823) and Colonial Secretary (1827), resigning from the Duke of Wellington's Cabinet in 1829. He was killed in a railway accident on the occasion of the opening of the Liverpool and Manchester railway.

Huss (or *Hus*), John (c. 1370-1415), Bohemian religious reformer, took his name from his birthplace, the village of Hussinecz. He distinguished himself at the University of Prague, where he became examiner and rector (1402 and 1409), and was the most popular preacher in the capital. As a result of his outspoken criticism of religious abuses and his adopting of some of the teaching of Wyclif, he was laid under a papal ban. Rioting broke out in Prague, where Huss had a large following, and 3 ringleaders were executed (1412). He was invited to the council at Constance (1414), but in spite of a safe conduct signed by the Emperor, was imprisoned, after a trial, at which false evidence was given against him, he was sentenced to death, and burnt at the stake.

Hussar, originally a soldier of the light horse, employed by the King of Hungary, to defend the country against the Turks. They were supposedly raised by the enlistment of each twentieth man (*Hung husz* = twenty). This form of light cavalry was adopted by Prussia, France, and other countries. The various British hussar regiments were converted from dragoons (*qv*) between 1805 and 1861, and still wear a uniform which is a modification of that of the Hungarians.

Hussites, the followers of the Bohemian John Huss (*qv*), who derived his theology from Wyclif (*qv*). They were early reformers in things ecclesiastical, and anti-landlord in

things economic. With the death of Huss at the hands of the Church the movement spread and riots broke out, culminating in revolution. At first the movement was successful, and finally peace was made after dissensions among the Hussites had resulted in the defeat of the extreme party. See also HUSSITE WAR.

Hussite War (1410-36), was fought between the Bohemian followers of Huss and the Pope and Emperor. The Hussites were fighting for national as well as religious freedom, and against the Imperial autocracy. A crusade against the Hussites was defeated in 1422, the Hussites also won repeated victories against the Germans in 1426 and 1427. The division of opinion between the moderates and extremists led to the defeat of the latter in 1434. By the Treaty of Iglau (1436) peace was established, and Bohemia obtained its religious freedom, when the doctrines of the moderate Hussites, called Utraquists, prevailed.

Hutchinson, Arthur Stuart Meneth (b. 1879), English novelist, author of *Once Aboard the Lugger* (1908), *If Winter Comes* (1921), *This Freedom* (1922), *One Increasing Purpose* (1925), *The Book of Simon* (1930), and other popular novels.

Hutten, Ulrich von (1488-1523), German soldier and author. He is best known as a satirist, attacking the Duke of Württemberg and the Papacy in virulent but musical verse. His most famous works are *Ars versificandi* (1511), *Nemo* (1518), parts of the *Epistolae obscurorum virorum* and poems in German and Latin on diverse subjects. A humanist, and a high-minded patriot who worked for the national regeneration of his country, Hutten failed because his appeals were addressed to a decadent nobility, whereas Luther, who lacked his genius, succeeded by appealing to the people.

Hutton, James (1726-1797), Scottish geologist, at first a doctor, and later a farmer. He retired to Edinburgh (1768) to devote himself to scientific

research. Investigating the origin of rocks and minerals he published (1785) *A Theory of the Earth* having in the previous year written *A Theory of Rain*. He was the first propounder of the now accepted theories of the formation of the crust of the earth.

Huxley Aldous Leonard (b 1894). English author who first came into prominence when his poem *Leda* appeared in 1900. With *Limbo* in the same year the novel *Crome Yellow* in 1911 and the collection of stories entitled *Mortal Coils* in 1922 he established himself as a promising and competent writer. The first of his books of essays *On the Margin* and the novel *Antic Hay* appeared in 1921. Of his later works *Those Barren Leaves* (1925), *Point Counter Point* (1928) and *Brave New World* (1932) are the best known. His talent finds best expression in the essay form in which most of his later work has been written.

Huxley Julian Sorell (b 1887). English scientist and author grandson of T. H. Huxley and brother of Aldous Huxley (q.v.). He has published numerous popular works on biology and general science including *Essays of a Biologist* (1923), *Religion without Revelation* (1927), *What Does It Think?* (1931).

Huxley Thomas Henry (1825-1895). English biologist. In 1842 he began to study medicine at Charing Cross Hospital passing for his M.B. degree three years later. In 1846 he joined the Navy as a surgeon on H.M.S. *Rattlesnake* which had been commissioned on a surveying voyage to Australia. During the voyage he studied the surface life of tropical seas. In 1851 he was elected F.R.S. and a year later was awarded the Royal Medal. At the age of 26 he was elected to the Council winning a place in the front rank of scientific men. He left the Navy in 1853.

Huxley who developed Cuvier's four group classification of the animal kingdom became a believer in evolution within groups and he would not

at first admit the *a priori* reasoning of a thoroughgoing evolutionist such as Herbert Spencer. The publication however in 1859 of Darwin's *Origin of Species* profoundly affected his outlook. Huxley filled many important positions including that of President of the Royal Society from 1891 to 1896. He was made a Privy Councillor in 1889.

Huxley worked with great energy as writer and lecturer to popularise the new scientific conceptions of his day especially the evolutionary theories of Darwin. Among his principal works were *Man's Place in Nature* (1863), *Lay Sermons Addressed to the People* (1860) and *Essays on Contradictory Questions* (1861). In his later years he took a considerable part in philosophical and theological controversy as an opponent of the orthodox Christian position as it was put forward in the eighties.

His eldest son Leonard Huxley and his grandsons Julian and Aldous Huxley (q.v.) are all well known in their respective spheres.

Huygens Christian (1629-1695). Dutch physicist. He was trained for law at Leyden but his bent was towards mathematics. At an early age he obtained the closest approximation of the ratio of the circumference to the radius of the circle (π). He experimented to show acceleration due to gravity though he did not propound the theory of gravity which Newton later developed. He was the first to realise the true character of Saturn's rings and discovered one of that planet's satellites. In 1666 he invented the pendulum clock as an astronomical instrument. Three huge object glasses which Huygens made are now kept by the Royal Society, London.

Huyssmans {WESMUN} name of a family of Flemish painters. JACOB HUYSSMANS (c 1633-1696) worked in England for the latter part of his life when he painted the portraits of Isaac Walton and Samuel Butler and others now in the National Portrait Gallery.

JAN BAPTIST HUYSMANS (1654-1716) is known chiefly as a landscape painter

CORNELIUS HUYSMANS (1648-1727) is the best-known of the three painters. His pictures are mostly of landscapes with figures, and a specimen of his work is in the National Gallery, London

Huysmans, Camille (b 1871), Belgian statesman, became professor at the Collège Libéral, Ypres, and later at the Université Nouvelle, Brussels. In 1910 he was deputy for Brussels in the Chamber, later representing Antwerp. He contributed to, and in some cases edited, various Socialist periodicals, and in 1914 was Secretary of the International (qv). In 1926 he was made Minister of Science and Arts

Huysmans, Joris Karl (1848-1907), French novelist of Dutch descent. His tastes developed from realism (as in *En Ménage*, 1881) to a Catholic mysticism (as in *La Cathédrale*, 1898; *L'Oblat*, 1903, and *Les Foules de Lourdes*, 1906)

Hwang-ho, a river in N China, more popularly known as the Yellow R. It is c 2600 m long, rises in Mongolia, and has one important tributary, the Wei-ho. The peculiarity of changing colour after passing the sands of Ala-Shan and the Ordos is due to the yellow earth obtained from deposits in the centre of the channel. The Hwang-ho has changed its lower course several times, notably during the last 80 years, when from entering the Yellow Sea well to the S of Shantung, it now empties itself into the Gulf of Chih-lih, near Lai-chow Bay, a distance of c 250 m to the N. It is of little importance economically owing to its swift and uncertain current and variable depth

Hyacinth, name for the cultivated form of the bluebell. It belongs to the family Liliaceæ, and has numerous fleshy flowers borne in a close mass on a succulent stem, and long, fleshy, grass-like leaves. See also BULBS

Hyades, see CONSTELLATIONS

Hyæna, a mammal of the order Carnivora (qv), dog-like in appear-

ance, but related to the civets and cats. Although large and powerful, hyænas are cowardly creatures, feeding mainly on carrion, including ex-humed bodies, but eating any small animals they come across, and occasionally carrying off children. They are remarkable for their strong jaws and teeth adapted for crushing big bones. There are three known species: the *Striped Hyæna*, found in India, S W Asia, and N Africa, distinguished by its shaggy coat and striped pattern; the *Brown Hyæna* or *Strand Wolf*, closely related to the last, but having no stripes on the body, inhabiting S W Africa, and the *Spotted Hyæna*, the largest of the three, which has a short coat, and inhabits Central and S Africa. From



Hyæna

its peculiar cry when excited this species is sometimes called the laughing hyæna

Hybridism, the production of new individuals by parents of different varieties, species, and even genera. Mongrels, hybrids of different varieties of dogs, are common. Hybridism of species is illustrated by the mule, the product of mating the horse and ass. The term "mongrel" is indifferently applied in common usage to any kind of hybrid, and "mule," to designate hybrids of birds, such as canaries and finches. Hybridism of genera is rare, but has been accomplished experimentally with sea urchins, and is said to occur between certain fishes. Hybrids arise in nature by sexual reproduction, but plant hybrids may be produced artificially by grafting

Wistaria has been successfully grafted on laburnum, cultivated stock on wild fruit trees and on trees needing improvement in quality and quantity of fruit. The most striking result of hybridism is increase in vigour. This is so marked that the term *hybrid vigour* is generally applied in biology to distinguish the vigour exhibited in various ways as a result of hybridism. The loganberry a cross between a blackberry and raspberry shows this vigour in its growth and fertility. The mule shows it in its general hardiness and power of endurance.

Whereas some hybrids are sterile others may be fertile. Hybrid may resemble one or both parents or may have entirely new characteristics. Such hybrids if sexually compatible may give rise to new species and thus become of evolutionary significance. Other hybrids like those Mendel (*q.v.*) produced by crossing two varieties of pea may breed in accordance with Mendel's laws. See also GENETICS. HEREDITY. MENDELISM. SEX.

Hydaspes Battle of the (37 B.C.) Alexander the Great with an army inflicted a crushing defeat by the banks of the R. Hydaspes (Jhelum) on the Indian king Porus. Porus was taken prisoner but Alexander made him his lieutenant over the captured territories which lay between the Indus and the Hydaspes.

Hyde Edward see CLARENDON

Hyderabad (or *Ilā dā ābad*) (3) The second largest and most populous native Indian State. It is situated in the Deccan and occupies an area of 87 698 sq. m. Pop. (1931) 14 436 148, mostly Hindus. It is ruled by the Nizam who is entitled to a salute of 21 guns. The administration is carried on by an Executive Council. There is also a legislative council consisting of official, non-official and extraordinary members. Apart from the Hyderabad municipality there are 15 district boards and more than 100 sub-district boards and the government of India is represented by a permanent resident with headquarters at Hyderabad. The

capital. For the maintenance of order there are regular troops, imperial service troops and what is called the Golconda Brigade. There is also a large police force. There are a number of educational institutions. Native labour is largely employed in the many cotton and flour mills. There are considerably more than 2000 co-operative credit societies operating in the State. There are 1300 m. of railways carrying only light traffic, two-thirds goods, the remainder passengers.

The present dynasty was founded in 1724. Prior to this Hyderabad was a province of the Mogul Empire.

() Capital of the State of Hyderabad dating from 1589. Pop. (1931) 466 894. There is a carpet industry and a silk hand loom weaving, trade of long standing. The climate is healthy and for the greater portion of the year temperate. The principal places of interest are the Nizam's Palace, the Jama Masjid Mosque, the Char Minar built in 1591, the ruins of Golconda, the ancient town of Bidar and the old Hindu capital of Warangal with beautifully sculptured temples. Hyderabad is on the air route between Bombay and Madras.

Hyderabad Battle of (Conquest of Sind) (Mar. 21, 1843) the British under Sir Charles Napier defeated the Baluchis under Shih Mohammed and thus broke the power of the Amirs of Sind.

Hyder Ali (c. 1725-1782) Indian ruler and soldier, the father of Tipu. He first distinguished himself at the siege of Devanahalli (1749) and by 1763 was master and ruler of Mysore. In 1766 he was involved in a quarrel with the British but the treaties of 1769 and 1770 preserved peace until 1779 when the British, by refusing the promised aid in his war with the Marhattas, roused the enmity of Hyder Ali. In 1779 the capture of Mahé by the British gave him a pretext to attack and he advanced devastating the country to the neighbourhood of Madras where he completely destroyed the British force.

of c 3000 men (1780) After this, he suffered reverses and the capture by the fleet of Negapatam forced him to flight He died suddenly at Chittur

Hydnocarpus Oil, fatty oil expressed from the seeds of the tree *Hydnocarpus wightiana*, found in Burma, Siam, and other parts of the Far East The oil is of value in the treatment of leprosy See OILS, FATS, AND WAXES

Hydra, in classical mythology, a nine-headed monster that infested the marshes of Lerna, near Argos The killing of this monster formed one of the twelve labours of Hercules (*qv*), who, finding that for every head he cut off two new ones grew, burnt out the root of each head, and buried the centre one, which was immortal, beneath a great rock

Hydrangea, flowering shrubby deciduous plant belonging to the genus Saxifragaceæ The leaves are large, coarse, pointed, and toothed, the stems fairly thick and much branched, 2-10 ft long, according to the variety, and the flowers, white, pink, and blue An ordinary soil should be enriched with decayed manure in Feb or March, and liquid manure given when the flower buds appear Propagation is by cuttings taken in August

Hydrates, name given to compounds which contain water of combination, more usually known as water of crystallisation If water is removed from hydrates, although the latter may be altered superficially, the essential characteristics of the substance are unchanged A large number of salts such as copper sulphate, $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$, potassium aluminium sulphate (alum) $\text{KAl}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$, calcium sulphate $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$, separate from their aqueous solution with water of crystallisation

Numerous substances, such as sulphuric acid and potassium hydroxide, form hydrates which are stable only at very low temperatures, such are known as cryohydrates Many substances are capable of forming two or more hydrates, sodium sulphate

forms a heptahydrate $\text{Na}_2\text{SO}_4 \cdot 7\text{H}_2\text{O}$ and a decahydrate $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$, the latter is the familiar Glauber's salt (*qv*); sodium sulphate may be obtained in the anhydrous form also

Hydraulic Cement, a cement that will harden under water It is made by burning limestone together with 5 per cent or more of clay The well known Portland cement (*qv*) is an example of this type See also CEMENT

Hydraulics, the application of hydrostatics, which deals with fluids at rest and hydrodynamics, which deals with fluids in motion What is commonly called the hydrostatic paradox is illustrated in Fig 1, where three columns of water, very different in both weight and length, are found to balance one another exactly This phenomenon

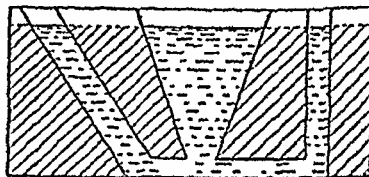


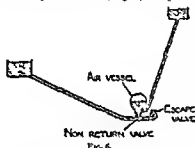
FIG 1

now presents no difficulty if we consider a large tank of water with thin tubes or partitions introduced to form any shapes we please, such as those in the figure No disturbance of the water level will take place even if various parts of the water are completely isolated from other parts We can then imagine the shaded parts of the water removed, whereby, since there is no communication, no change will be produced in the other parts

A fundamental law of hydrostatics states that in a liquid with a free surface at rest under the force of gravity, the pressure at any point depends solely upon the depth of that point below the surface of the liquid This pressure is the same in all directions, thus, a small air bubble tends to be spherical in shape. If we have a body of fluid enclosed entirely in a rigid vessel provided with a piston, the

flow of rivers and artificial waterways is of great importance. Apart from the quantity of water flowing at various seasons the obstruction to flow presented by bridge piers, bends, banks and other obstacles may greatly affect the state of the channel as may also any artificial change of level produced by building new locks or taking water off at some point. Many methods show the rate of flow among them small submerged propellers geared to indicators similar to a ship's patent log, the injection of coloured substances, floats and measurements with the Pitot tube (q.v.).

The *hydraulic ram* (Fig. 6) comprises



a long pipe supplied with low pressure water and leading into a closed chamber provided with an escape valve. From the vessel a pipe provided with a non return valve passes to a tank at a greater height than the head of the supply. The water from the supply rushes down the pipe into the chamber and escapes by the valve until its speed is sufficient to close the latter suddenly. This checks the flow of the rapidly moving body of water and a pressure is built up in the chamber much in excess of the pressure of the original water and this is used up in forcing a little water up to a much greater height. A more elaborate device of this type is the *tail's hydram* (q.v.). Hydraulic power for operating lifts, cranes and other machinery once dominant but is being displaced largely by electricity. In many

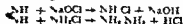
large towns high pressure hydraulic mains are available and hydraulic lifts are used in considerable numbers. The system is extremely simple, the lift being operated by a long steel ram from a cylinder sunk in the lift well. Low pressure water mains can operate plant requiring high pressure by means of the *hydraulic intensifier*, two pistons of different diameters joined together in tandem and working in cylinders, the larger piston being raised by the low pressure water and generating a much higher pressure in the smaller cylinder.

An interesting application of hydraulics is the Constantinesco system of *wave transmission of energy*. At one end of a pipe line is a piston which is rapidly reciprocated by a source of power. This sends a wave of compression through the liquid in the pipe with the velocity of sound and will operate a similar piston at the other end. This system was devised during the War for operating machine-guns firing between the blades of an aeroplane propeller.

Hydraulic transmission of the drive of a motor-car engine to the wheels is now practised but the method is too complicated for detailed description here. The *Foster hydraulic motor* which couples the drive of a high speed steam turbine to a slow speed propeller consists of a centrifugal pump operating directly upon a turbine on the same shaft. Its efficiency is c. 90 per cent.

Consult *Hydraulics and its Applications* by A. H. Gibson (London 1935).

Hydrazine (or *Diam*) a hydride of nitrogen having the formula N_2H_4 . It is a colourless liquid boiling at 113.5°C and solidifying at 1°C. Hydrazine can be prepared by the action of sodium hypochlorite on a solution of ammonia in the presence of a small quantity of glue, the reactions that occur being



Hydrazine forms a hydrate with water

twist it back to its original position the original equilibrium was stable, if they tend to twist it farther, it was unstable. If we displace the body very slightly, and draw a line vertically through the new centre of buoyancy, it will meet the line drawn through the centre of gravity and the original centre of buoyancy at a point called the *metacentre*, the distance of the metacentre from the centre of gravity is called the *metacentric height*. For equilibrium, the metacentre must be above the centre of gravity. The stability of a ship depends entirely upon the metacentre being above the centre of gravity, however the ship be loaded, or caused to roll by the waves. The position of the metacentre changes, of course, with the angle of roll, and if the ship rolls far enough, it may turn completely over if the metacentre should fall below the centre of gravity.

In *hydrodynamics*, we deal with the motion of liquids, usually divided into two types—*streamline motion*, in which the fluid flow is steady along certain lines, and *turbulent motion*, in which the fluid is thrown into eddies. The science of streamline flow is comparatively simple. In practice it is met with in two cases, firstly, when the motion is so slow or the fluid so viscous that eddies are not formed, or secondly, when the fluid is flowing in channels or around objects of such shape that they do not cause eddies. Consider a trough having a projection from one side. If a viscous liquid is flowing, the projection will not cause an eddy or swirl, but if the liquid is moving or flowing very fast, eddies will form. It is possible to shape the projection to lessen or even eliminate the tendency to eddy. With any given channel and fluid, there is a critical velocity of flow above which eddies are

these considerations are of practical importance when a fluid moves through channels or pipes. Water descending in a reservoir through wide pipes to a machine by which its pressure is converted into mechanical work, is

moving comparatively slowly, and its energy is due mainly to its pressure, but if it escapes through a narrow pipe, the pressure is reduced to that of the atmosphere and its energy is converted into kinetic energy, the jet has enormous force which may be used to drive a turbine. By suitably shaping the construction of the pipe leading to the jet, we are almost able to prevent the formation of eddies which would cause a disastrous loss of energy. A pipe which is correctly constructed has the water at the narrowest part, but this has been converted to kinetic energy, since the water there is flowing faster. This is the principle of Venturi meter (Fig 5), by which

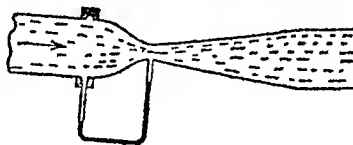


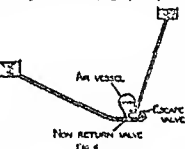
FIG 5

velocity of flow of water is generally measured. At the narrowest point of the contraction the pressure is lower than in the pipe before contraction, and this difference is measured on a mercury pressure gauge.

The practical application of hydrodynamics depends, not only on the above scientific principles, but upon a great number of experimentally ascertained facts whose mathematical difficulties prevent their being solved from first principles. Small-scale models show the behaviour of bodies of water flowing under differing conditions. Recently very elaborate models have been made to predict the effect of harbour works. The flow of water through pipes, open channels, weirs, valves, and nozzles, can now be determined by empirical formulæ. The behaviour of ships is tested by making models of proposed designs and towing them in a tank provided with elaborate apparatus for noting their movements under different conditions. The study of the

low of rivers and artificial waterways of great importance. Apart from the quantity of water flowing at various seasons the obstruction to flow prevented by bridge piers bends banks and other obstacles may greatly affect the state of the channel as may also any artificial change of level produced by building new locks or taking water off at some point. Many methods show the rate of flow among them small submerged propellers compared to indicators similar to a cup anemometer log the injection of coloured substances floats and measurements with the Pitot tube (q.v.).

The hydraulic ram (Fig. 6) comprises



long pipe supplied with water from a reservoir and leading into a closed chamber provided with an escape valve from the vessel a pipe provided with a non return valve passes to a tank at a greater height than the head of the supply. The water from the supply runs down the pipe into the chamber and escapes by the valve until its speed is sufficient to close the latter suddenly. This checks the flow of the supply moving body of water and a pressure is built up in the chamber much in excess of the pressure of the original water and this is used up in forcing a little water up to a much greater height. A reverse flow valve prevents the water from returning to the supply. Hydraulic power for operating lifts cranes and conveyors is very much more dominant but is being displaced largely by electricity. In many

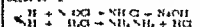
large towns high pressure hydraulic mains are available and hydraulic lifts are used in considerable numbers. The system is extremely simple the lift being operated by a long steel ram from a cylinder sunk in the lift well. Low pressure water mains can operate plant requiring high pressure by means of the hydraulic intensifier two pistons of different diameters joined together in tandem and working in cylinders the larger piston being raised by the low pressure water and generating a much higher pressure in the smaller cylinder.

An interesting application of hydraulics is the Constantinescu system of wave transmission of energy. At one end of a pipe line is a piston which is rapidly reciprocated by a source of power. This sends a wave of compression through the liquid in the pipe with the velocity of sound and will operate a similar piston at the other end. This system was devised during the War I for operating machine guns firing through the blades of an aeroplane propeller.

Hydraulic transmission of the drive of a motor-car engine to the wheels is now practised but the method is too complicated for detailed description here. The *Hydraulic Transmission* which couples the drive of a high speed steam turbine to a slow speed propeller consists of a centrifugal pump operating directly upon a turbine on the same shaft. Its efficiency is 90 per cent.

Consult *Hydraulic Engineering* by A. W. C. G. (London 1935).

Hydrazine, N_2H_4 , a liquid of density 1.02 having the formula N_2H_4 . It is a colourless liquid boiling at 113.3°C and melting at -1.1°C . It is said to be prepared by the action of sodium hydride on a solution of ammonia in the presence of a small quantity of glue to reactions that occur be:



Hydrazine forms a hydrazine hydrate

and salts with the various acids. It is an extremely powerful reducing agent and is very poisonous. Hydrazine is employed principally in the manufacture of an organic derivative *phenylhydrazine* which is a useful reagent in the analysis of sugars, with many of which it gives characteristic compounds.

Hydrazoic Acid, *see* AZIDES

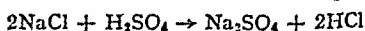
Hydrocarbons, compounds consisting exclusively of carbon and hydrogen. They are very extensively distributed in nature, and may belong either to the aliphatic or aromatic series (*qq v*). The hydrocarbons may either be saturated or unsaturated, the former occurring naturally only in the aliphatic series, and being extremely stable compounds very resistant to chemical reagents. The typical and simplest member of this series is methane (*q v*), CH_4 . In the aromatic series, all the naturally occurring hydrocarbons are unsaturated, but, owing to their cyclic structure, they are considerably more stable than the unsaturated aliphatic hydrocarbons. The principal natural source of hydrocarbons is petroleum (*q v*). They also occur in the decomposition of organic matter, and in small quantities in living vegetable and animal material. In general the saturated hydrocarbons are designated by the termination "ane" and the unsaturated by the termination "ene".

Hydrocephalus, "water on the brain," a condition due to effusion of fluid into the cavities of the brain. It is a kind of dropsy (*q v*), and is characterised by great enlargement of the cranium out of all proportion to the face. It is most frequently developed in infants under 6 months in age, and may be a congenital defect. The child is usually physically and mentally defective, and rarely lives long. Operative treatment has been tried, but is seldom successful.

Hydrochloric Acid (or *Hydrogen Chloride*), HCl , is a colourless pungent-smelling poisonous gas which liquefies at -85°C . and solidifies at -111°C .

The gas is extremely soluble in water, and is almost invariably met with in the form of its aqueous solution, the expression hydrochloric acid thus meaning an aqueous solution of hydrogen chloride, it is also commonly known as spirits of salt. The older term *muratic acid* is obsolete.

The principal method for the manufacture of hydrochloric acid is by the interaction of sulphuric acid and common salt (sodium chloride), the resulting hydrogen chloride being absorbed in water. The reaction occurring is:



The above reaction is a stage in the Leblanc soda process (*see* ALKALI INDUSTRY), and in the early days of that process the hydrochloric acid formed during the manufacture of the sodium sulphate was allowed to go to waste. This would, under modern conditions, be uneconomical, as well as in most countries illegal on account of the pollution of the atmosphere caused by the acid fumes.

Hydrochloric acid is now manufactured by the direct combination of hydrogen and chlorine. These gases are obtained as by-products during the electrolytic method for the manufacture of caustic soda, and their combination is assisted by passing them over activated charcoal.

Hydrochloric acid is found in nature as an essential constituent of the gastric juices of man and animals, the amount present in the stomach fluid being c. 3 per cent. An aqueous solution of hydrogen chloride is a very strong acid, and together with nitric and sulphuric acids it is one of the acids usually referred to as the "mineral acids" which are to be found on the bench of every laboratory where they are used in numerous analytical and preparatory operations.

Industrially, one of the principal uses of hydrochloric acid is as a cleansing agent, since it dissolves iron oxide which is the principal constituent of rust. It is one of the "heavy chemicals" utilised by industry in

large quantities for a very wide variety of purposes such as organic synthesis and lithography. Owing to its strong solvent action the transport of hydrochloric acid can be carried out only in vessels constructed from a limited number of materials such as glass bottles and tanks lined with rubber.

As stated above hydrogen chloride is extremely soluble in water at 18°C 500 volumes of the gas are dissolved and in one volume of water a saturated solution at this temperature contains 42 per cent of the gas and has a specific gravity of 1.2. An aqueous solution containing .024 per cent of hydrogen chloride has a constant boiling point of 110°C.

Hydrocyanic Acid (or *Hydrogen Cyanide* HCN) a colourless poisonous gas formed by the action of acids on cyanides. It is also known as prussic acid. See also CYANIDES.

Hydrofluoric Acid (or *Hydrogen Fluoride*) HF can be obtained by the action of an acid on a fluoride usually of sulphuric acid on calcium fluoride. Pure hydrofluoric acid is a colourless pungent corrosive liquid boiling at 19°C and melting at -92°C. It is extremely soluble in water and forms a constant boiling mixture containing 37 per cent of hydrogen fluoride distilling at 10°C.

Hydrofluoric acid has the valuable property of attacking glass and is therefore widely used for glass etching on account of this property it is stored in rubber wax or lead bottles. The pure acid is rarely utilised the aqueous solution of various strengths being the form in which the acid is employed. See also FLUORINE.

Hydrogen a gaseous element which has the distinction of being the lightest substance known. It occurs naturally in the atmosphere to a minute degree and is also found in the free state in some natural gases and in volcanic emanations. In the combined state hydrogen is very widely distributed in enormous quantities one of its principal sources is water which is the oxide of hydrogen.

Hydrogen is colourless odourless and tasteless it is highly inflammable and with air forms a violently explosive mixture. The physical and chemical characteristics of hydrogen are given in the article ELEMENTS.

In the laboratory hydrogen is usually prepared by the action of a dilute acid on a metal e.g. the reaction of dilute sulphuric acid with commercial zinc (the pure metal does not interact with the acid). Hydrogen is also required however in enormous quantities for various industrial processes principally hydrogenation and the manufacture of ammonia and for these purposes other methods have to be employed. The purest product is obtained by the electrolysis of water which is rendered conducting by dissolving in it small amounts of an electrolyte this process however is economically possible only if cheap electric power is available. Another process which is used commercially is the decomposition of steam by red hot iron according to the following equation



This reaction is reversible and the proportion of hydrogen decreases with a rise in temperature the best results are obtained at 600°C. An impure hydrogen may be prepared in the form of water gas (qv) by the action of steam on red hot coke when the following reaction occurs



a subsidiary reaction being—



This method is chiefly employed where the water gas is to be used as such since otherwise the expense of removing the oxides of carbon is usually too great.

The chief use of hydrogen is for the hydrogenation (qv) of various substances such as oils organic compounds like naphthalene coal etc. The gas is also employed for the inflation of aircraft but is being super-

seded for this purpose by the non-inflammable helium. Other uses are the production of the oxy-hydrogen flame for welding, the filling of certain electric lamps, and various laboratory purposes.

An interesting form of hydrogen which has recently been prepared is active hydrogen, which has the molecular formula H_2 . It bears the same relation to hydrogen that ozone does to oxygen, and can be prepared by an analogous method, namely, passing a silent electric discharge through hydrogen. Hyzone, which is the name suggested for this triatomic hydrogen, is extremely reactive, and will attack sulphur with the formation of hydrogen sulphide, and nitrogen with the formation of ammonia at ordinary temperatures and pressures. An active form of hydrogen, consisting of monoatomic molecules, has also been prepared, having similar properties to the triatomic form, and some workers, in fact, deny the existence of this latter. When atomic hydrogen recombines to form the ordinary molecular variety, great heat is generated, and this has been applied industrially in the manufacture of the "atomic hydrogen blowpipe," in which the heat generated at an iron surface by the recombination of hydrogen, which has been dissociated by passage through an electric arc, is used for welding purposes.

The atomic structure of hydrogen is the simplest possible, consisting of a nucleus or proton with one electron revolving round it (see ATOM), it is of interest to note that modern theories of atomic structure have shown the fundamental truth of the hypothesis, put forward by Prout in 1815, that hydrogen may be regarded as the primary matter from which all other elements are formed by condensation. A molecule of hydrogen consists of 2 nuclei or protons together with 2 electrons whose orbits may surround both the nuclei. Recent spectroscopic investigations have shown that two forms of the gas exist, according

as the nuclei revolve in the same or in opposite directions round about 2 parallel lines. In the first case the element is in the form of *ortho*-hydrogen, and in the second of *para*-hydrogen. They can be distinguished by the difference in their specific heats, under ordinary conditions hydrogen consists of 75 per cent of the *ortho* form.

Compounds of Hydrogen. Hydrogen forms an enormous number of compounds with the great majority of the elements. It is also present in nearly all organic compounds. In the majority of its inorganic compounds hydrogen functions as a positively charged ion, but there are exceptions to this rule, for instance, on the electrolysis of lithium hydride hydrogen is given off at the anode. Within recent years several new hydrides have been prepared, such as those of tin, lead, germanium, and bismuth. With boron and silicon hydrogen forms a series of hydrides which are very similar to the lower members of the hydrocarbons (i.e. carbon hydrides). The more important hydrogen compounds, such as water, hydrogen peroxide, hydrochloric acid, etc., are described under their own headings.

Hydrogenation, term applied to processes in organic chemistry which consist in the addition of hydrogen to an unsaturated compound so as to saturate it fully or partially. Hydrogenation is essentially a catalytic reaction, and the principal examples of technical hydrogenation are discussed more fully in the article CATALYSIS.

The pioneer work on catalytic hydrogenation was done in the closing years of the last century by two French chemists, Sabatier and Senderens. They discovered that in the presence of certain substances (catalysts), such as finely divided nickel, iron, and metals of the platinum group, unsaturated organic compounds would add on hydrogen and become saturated. The first industrial application of this discovery was to the hydrogenation (hardening) of naturally occurring liquid

fatty oils so that they become partially saturated and thus acquire a consistency more suitable for their commercial utilisation (See FAT HARDENING OILS FATS AND WAXES).

Other hydrogenations of this type which are of industrial importance are the production of various synthetic compounds chiefly for use as solvents such as the hydrogenated naphthalenes (tetralin and decalin *qqa*).

The possibility of hydrogenating coal so as to obtain from it volatile fuel is suitable for use as motor spirit first studied by Bergius in 1913 has now become entirely practicable and has merely been retarded in its application by the extremely low price of naturally occurring mineral oils which has made it unprofitable to erect expensive plant to produce at a slightly higher cost a competitive product. In many countries however including England the hydrogenation of coal is being supported by the grant of a preferential rate of duty on home produced motor fuel. The process consists briefly in making the coal into a thick paste with oil and then subjecting this to hydrogenation at high pressure and temperature. On distillation this gives a considerable yield of the lower volatile hydrocarbon fractions.

Hydrogenation is also applied to the manufacture of various semi-synthetic products from mineral oil. By the hydrogenation of mineral oil at high pressure and temperature it is possible to produce by varying the feed-stock such products as specially resistant lubricating oils solvent naphthas petrols having a high anti-knock value and for aeroplane safety fuels which have a high flash point. These two latter types of catalytic hydrogenation (i.e. of coal and of mineral oil) differ from the processes originally brought out by Sabatier in that they are carried out at higher temperatures and pressures (i.e. of the order of 500°C and 100 atmospheres). They have been rendered possible by the production of catalysts

(such as iron oxide vanadium chromum molybdenum etc.) which are not easily affected by such catalyst poisons as for instance sulphur.

The reverse process to hydrogenation i.e. dehydrogenation can in many cases be carried out by leading a hydrogenated product over a catalyst often the same catalyst as that used for hydrogenation but at a somewhat higher temperature. The process is more of theoretical than practical interest.

See also CATALYSIS INDUSTRIAL APPLICATIONS OF

Hydrogen Ion Concentration In the article ELECTRO-CHEMISTRY the theory of electrolytic dissociation is explained together with its bearing upon the electrical potential assumed by an electrode when placed in contact with a solution of one of its salts. This theory applies to all the chemical elements but its application to hydrogen has recently become of such great importance that the term hydrogen ion concentration (PH or pH) is familiar in medical and industrial work to very many people who have but little knowledge of electro-chemistry.

The purest water is slightly dissociated into the ions OH^- and H^+ . The product of the concentrations of these ions is a constant by the law of mass action. This concentration is very small. The concentrations of H^+ and OH^- are equal (expressed in gramme-equivalents) in pure water being 10^{-7} gramme equivalent per litre. Since the equivalent weight of hydrogen is 1 this expresses also the weight in grammes of the hydrogen ions present. If we add an alkali e.g. caustic soda (NaOH) to the liquid the concentration of OH^- ions is greatly increased and that of the H^+ ions therefore greatly diminished since the product of the two is constant. If we add an acid we increase the hydrogen ions and correspondingly diminish the OH^- ions.

Pure water is perfectly neutral hence any solution containing less concentra-

tion of hydrogen ions than pure water is alkaline, while any solution containing more is acid. Such figures as 10^{-7} (expressing the concentration in pure water) are very clumsy, and the term *pH* or *PH* is often used. It is defined as the logarithm of the concentration with the sign reversed. In the case of pure water, for example, the *pH* is 7, the logarithm of 10^{-7} being minus 7. The less the *pH*, the more acid the liquid. A dilute mineral acid has a *pH* of c 2, a dilute caustic alkali of c 12.

Hydrogen-ion concentration can be determined either by measuring the electric potential of hydrogen against the solution, or by the use of certain coloured substances which change their colour according to the concentration of hydrogen ions present.

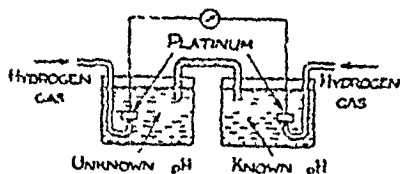


Diagram of Experiment to determine Hydrogen Ion Concentration

The practical applications of hydrogen-ion measurement are very numerous. In analytical chemistry the method serves to replace the use of coloured indicators in volumetric analysis, and enables titrations to be carried out with strongly coloured or turbid liquids. But its importance is rapidly growing in many fields of organic chemical industry, such as the tanning of hides, the manufacture of sugar and paper, the brewing of beer, the treatment of milk, the baking of bread, and the preservation of food products of all kinds. There are various reasons for this. One is that hydrogen ions catalyse many organic reactions, such as the inversion of sugar (see CATALYSIS; SUGAR), and the action of bacteria and enzymes depends on the correct adjustment of the *pH*. The *pH* of water and

aqueous liquids has a great effect on the rate at which they corrode iron and steel, this rate rising very suddenly when the *pH* becomes 4 or less. This fact also bears upon the corrosion of tins used to contain food products. Other applications of industrial importance are found in sewage disposal, flotation of ore, the dyeing and bleaching of textiles, the manufacture of photographic emulsions, rubber, explosives, and many others.

See H. T. S. Britton, *Hydrogen Ions* (London, 1932).

Hydrogen Peroxide (or *Hydrogen Dioxide*), H_2O_2 is, when pure, a colourless, oily liquid which boils at $80^\circ C$ and solidifies at $-2^\circ C$. It is usually prepared by the action upon barium peroxide of either a dilute mineral acid, usually sulphuric, or of carbon dioxide and water under pressure.

The hydrogen peroxide thus obtained is in the form of an aqueous solution which may be concentrated by evaporation under reduced pressure. The anhydrous peroxide can be obtained by distillation and freezing, but in practice it is never employed as such, and only the aqueous solutions are used. The strength of such a solution is expressed in "volumes," which signifies the amount of oxygen that it will give off on decomposition, thus a 10-volume solution of hydrogen peroxide will give off 10 times its own volume of oxygen; the strongest commercial solution is known as "perhydrol," and corresponds to a 40 per cent or 100-volume solution. It is usual to add a small amount of acetanilide to hydrogen peroxide solutions, as this has the effect of acting as a negative catalyst, slowing down the decomposition of the hydrogen peroxide into water and oxygen. Such decomposition is, however, continually proceeding in hydrogen peroxide solutions, and is accelerated by light and heat. The alkali present in glass also tends to assist the decomposition, so bottles intended for the storage of hydrogen peroxide solutions are very often lined with paraffin wax. Hydro-

gen peroxide is a very powerful oxidising agent and this is the purpose for which it is principally employed the oxidising action also being responsible for its bleaching and disinfecting properties. When used industrially as a bleaching agent (for straw ivory etc.) it is found that the action is improved if the solution is made slightly alkaline (*see* BLEACHING). Hydrogen peroxide is a very popular disinfectant in surgery and is employed extensively as a mouth wash also.

Hydrography is the science of nautical surveying the results of which are embodied in the charts used by navigators. The principles upon which marine surveying is conducted are fundamentally similar to those used in land surveying (*qv*) as regards the determination of geographical position and coast contours but the hydrographer is obliged to have recourse to soundings in determining the character of the sea bottom. He also requires to obtain information as to the movement of the ocean including the rise and fall of the tide and the direction and speed of currents. The nautical *chart* embodies an immense amount of information: the depth of the sea is given in fathoms (6 ft.) and the direction of current together with their velocity is shown by arrows. Shoals are shown enclosed in dotted lines. The chief landmarks on the coast are shown and on the side of the chart a distant view of the coast is frequently engraved together with the name of the landmarks shown on it. The chart shows the position of all light houses together with their bearings and the period of occultation of the light. *See also* SOUNDING.

CONSULT C. F. Close *Textbook of Hydrographical Surveying* (London 1905).

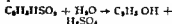
Hydrolith, *see* CALCIUM.

Hydrolysis literally, breaking down by water, a term used in chemistry to denote the decomposition of a compound by the action of water. It may occur both in the case of inorganic and of organic compounds. Thus potas-

sium cyanide in solution in water is hydrolysed to a considerable extent with the production of potassium hydroxide and hydrogen cyanide according to the equation



A typical case of hydrolysis of an organic compound is that of ethyl sulphate—



This latter reaction will occur merely by raising the temperature to boiling but in the majority of instances of the hydrolysis of organic compounds the reaction can take place only in the presence of an acid or an alkali which acts by increasing the concentration of hydrogen (H) or hydroxyl (OH) ions in the solution these ions being the effective agents which cause hydrolysis and not water in the form of H_2O . As the acid or base used can however be recovered unchanged at the end of the process (unless it should happen to combine with one of the reaction products) the process may be said to come within the definition of a catalytic one. Saponification is a special case of hydrolysis being the decomposition of the glyceryl esters of fatty acids the resulting free acids combining with the base used to promote the saponification with the formation of soaps (*qt*).

Hydromedusae *see* HYDROZOA.

Hydrometer *see* ALCOHOLOMETRY.

Hydrophobia is a disease resulting from the entry into the human body of the virus (*qt*) of an animal affected with rabies. Infection takes place generally by means of the saliva of the rabid animal which enters the wound produced by a bite.

The signs of rabie in dogs include depression, little or no sleep, depraved appetite, irritability, hoarse bark, difficulty in swallowing, paralysis of the lower jaws and the limbs and finally death.

In man after 40 days there is often intense irritation about the wound or scar and a general feeling of malaise.

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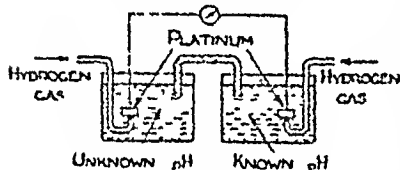


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aromatic series (e.g. salicylic or o hydroxy benzoic acid)

Hydroxylamine (or *Hydroxy-ammonia*) NH_2OH is an unstable substance forming white odourless crystals of melting point 33°C . Both the free base and its salts are strong reducing agents with organic substances containing aldehyde or ketone groups it reacts to form organic nitrogenous compounds known as *osimes*. Hydroxylamine hydrochloride is employed in photography as a developer it can be prepared by the action of tin and hydrochloric acid on a nitrate or nitrite.

Hydrozoa (or *Hydromedusæ*) one of the primary divisions of the Cœleoterate phylum of animals.

See also CœLETERATA

Hygieia [hîjî E X] is classical mythology the goddess of health (whence the word hygiene) and daughter of Æsculap (q.v.)

Hygiene the science of the preservation of health and the prevention of disease. Personal hygiene concerns the means for the maintenance of health which are under the control of the individual and includes dieting, exercise, sleep and the other normal bodily functions. The larger matters which concern the health of the community and require co-operative effort such as water supply, drainage, housing, food inspection and the control of epidemics are generally regarded as appertaining to the question of public health (q.v.) See also SANITATION

Hygrometer an apparatus for measuring the amount of water vapour present in the atmosphere. There are two ways in which this may be expressed. One is as a percentage by volume of the air or the *partial pressure* of water vapour and the other is the *dew point* being the temperature to which the air must be cooled in order that the water vapour present in it may condense to water. If water be enclosed in a vacuum it will fill the space above it with vapour the pressure of which varies with the temperature. The dew point is measured

by cooling a bright silver surface until it is dimmed by the condensation of moisture (Dewonell's hygrometer). Recently a self recording instrument has been made in which the surface cooled is a plate of glass provided with a very thin coating of platinum divided into two by narrow lines the two halves being connected to an electric battery. The temperature of the glass is gradually reduced and at the same time recorded when the dew point is reached the surface of the glass becomes conducting and a slight electric current passes across the strip of platinum. This causes the fall of temperature to cease which is indicated on the record. After the temperature has risen again slightly cooling begins again automatically.

Another method frequently employed consists in observing two thermometers one of which has its bulb wrapped in cotton kept moist by water. The evaporation causes the second thermometer to indicate a lower temperature than the other.

One of the first hygrometers was devised by De Saussure ($1740-1829$) and depends upon the fact that many organic substances such as catgut, hair and wood are so capillary to moisture the effect of which is to cause them to expand or contract. Most people are familiar with the way in which canvas or rope shrinks when wetted this shrinkage takes place to a lesser degree when the air is made moist. A familiar toy is the Swiss weather prophet consisting of two little figures one of which comes out of a house according as the weather is to be fine or wet the figures are governed by a twisted hair which is affected by the degree of moisture in the atmosphere. Similar instruments are used in checking the degree of moisture in workrooms, storehouses, etc. They are usually made with human hair the expansion and contraction of which turns a very light pointer.

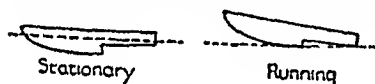
Hyksos name of early Eastern invaders of Egypt whose rulers known as the *Shepherd Kings* held the

chill, and giddiness. Eventually the muscles of the pharynx and chest go into spasm and then become paralysed, and the disease ends fatally in from 2 to 4 days thereafter.

Treatment consists in excision or cauterisation of the original wound, and the injection of preventive material obtainable at the Pasteur Institute. This preventive material consists of attenuated virus which, when injected into the body, stimulates the production of anti-toxins without actually producing the disease. See also TOXINS.

Hydrophyllaceæ, see FERNES

Hydroplane, a boat of peculiar design entirely different in principle from all others, and suitable only for very high speeds. The resistance to the motion of an ordinary boat presented by the water which it displaces, in a bulk equal to its own weight, depends



Hydroplanes

greatly on the shape of the vessel, the object being to avoid the production of eddies in the water, which waste energy (see HYDRODYNAMICS). At high speeds, however, it is impossible to avoid another source of energy loss, the production of waves on the water surface. In the hydroplane the boat is so shaped that the hull is lifted out of the water when a sufficient speed is attained, the boat then attains a position of equilibrium in which the after path of two flat planes forming the bottom (see fig.) alone touch the water, the weight of the boat being carried by the pressure of the water acting upon the inclined surfaces of the plane. Much experiment has resulted in various types of hull, some of which represent an intermediate stage between the ordinary boat and the hydroplane. The racing of hydroplane motor-boats has become a popular sport, especially since the development of the outboard motor

attached to the stern of the boat, and capable of the development of extraordinary power for its weight.

Hydroquinone, *quinol*, or *p-dihydroxy-benzene*, is a white crystalline compound of melting-point 169°C with the formula $\text{C}_6\text{H}_4(\text{OH})_2$. It is prepared by the reduction of quinone (which is obtained by the oxidation of aniline) with sulphurous acid. It is a very powerful reducing agent, and is used to a considerable extent in photography as a developer, it also finds slight use in medicine as an antiseptic.

Hydrosphere, the liquid layer on the surface of the earth which rests in the principal hollows of the earth's crust or lithosphere (*qv*). It covers rather more than 70 per cent of the globe and is contained principally in the various oceans, a small quantity in lakes and rivers, and a certain amount is evaporated and present as water vapour in the air.

See also OCEANS AND SEAS, EARTH

Hydrostatics, see HYDRAULICS

Hydrotherapy (or *Hydriopathy*), a method of treating disease by baths and mineral waters, practised since the time of Hippocrates. The application of water to the skin stimulates the nerve endings. Cold baths contract the small blood-vessels in the skin, and cause a rise in blood pressure and stimulus to the circulation, but abstract heat from the body, hence they are suitable only for the young and healthy. They are also employed to reduce temperature in dangerously high fever. Warm baths soothe the nerves and relieve pain. Hot fomentations relieve local pain and inflammation. Large draughts of water were formerly given to wash out the system, but are now known to impair digestion. Hot water is often a useful drink for dyspepsia (*qv*). See also SPA.

Hydroxy-Acids, organic acids which, in addition to containing the characteristic grouping of organic acids (COOH), also contain one or more hydroxyl (OH) groups. Hydroxy-acids can occur both in the aliphatic series (e.g. glycolic or hydroxy-acetic acid) and in the

respect. The action of the two isomers on the central nervous system is the same. Hyoscyne is used in practice as a hypnotic and together with morphine it is used for the production of twilight sleep, a form of semi-anæsthesia used to moderate the pains of parturition. It is usually employed in the form of its hydro-bromide which is water soluble. *See also* ALKALOIDS.

Hyoscyamine alkaloid obtained from the belladonna and henbane plants. It is the optically active isomer of the alkaloid atropine (qv) (optically inactive) which is prepared from it. Hyoscyamine exists in both the *l* and *d* forms, the latter has a much weaker action on nerve-endings but a stronger effect on the reflexes which it increases. Medicinally *l* hyoscyamine is used (in the form of the sulphate) as a narcotic and sedative.

Hypabyssal Rocks are those which are injected into the earth's crust at no great depth from the surface as dykes, sills or veins. They include dolerites, porphyries (qv) and others. *See also* IGNEOUS ROCKS.

Hypæthral (architecture) open to the sky (Latin *hypæthrus*, Greek *ὑπαῖθρος* or under the open sky). Said of a building without a roof or with an opening in its roof. The term is due to Vitruvius who refers thus to the Temple of Zeus in Athens. As a rule Greek temples were apparently not hypæthral, the *cella* being lighted by the entrance door only (there being no windows in the walls).

Hypatia a learned and beautiful woman of Alexandria, daughter of the mathematician Theon. A follower of Plotinus, her intellectual gifts gained her the leadership of the Neoplatonic school in Alexandria. She was murdered (A.D. 415) by a Christian mob. *See* Charles Kingsley's novel *Hypatia* (1853).

Hyperæsthesia, *see* PSYCHICAL RESEARCH.

Hyperbola, *see* TRIGONOMETRY.
Hyperbole [ὑπερβολή] rhetoric term for exaggerated or exstatement.

Hyperion [ὑπεριόν] in classical

mythology a Titan son of Uranus (Heaven) and Gæa (Earth) and father of Helios, the Sun, and Selene, the Moon. The name is often used as a patronymic for the Sun. Many references to him are found in literature e.g. Keats's poem *Hyperion*.

Hypnone drug used as a soporific. Chemically it is a ketone, acetophenone (qv).

Hypnotism, induction of hypnosis, a state resembling profound sleep, usually artificially induced, marked by subconscious activity and sensitiveness to suggestion. The method has been known in the East from remote antiquity, but it was not till the 18th cent. that F. A. Mesmer (qv) introduced it into Europe under the name of mesmerism. Mesmer's theories were discredited and nothing more was heard of the method till a Manchester surgeon called Braid revived it in 1841. It plays an important part in the therapy of psycho-analysis (qv).

Hypocaust [ὑποκαύωστος] space below the floor of a Roman house filled with hot air from a furnace with the object of heating the room. This feature was common in baths and in Roman villas built in outlying provinces of the empire (England, Germany, etc.).

Hypochondriasis a morbid mental condition in which the affected person constantly thinks he is seriously ill, generally referring the ailments to the stomach or liver. He becomes gloomy and self-centred. Sometimes the condition is hereditary and may pass into melancholia (*see* INSANITY) but usually it is a neurosis and the ultimate abnormal mental condition causing it must be discovered and treated. The affected person must make a strong effort of will to overcome it at the same time and should take up some active work.

Hypodermic Syringe an instrument for injecting concentrated solutions of drugs under the skin, a method now preferred to administration by the mouth because of the more rapid action and greater facility for regula-

country c 3000-2500 B C, constituting the 15th, 16th, and 17th dynasties. Their origins are obscure, the theory that they were Semites being now discredited. They were finally defeated after a long rebellion and expelled.

Hymen, the Greek god of marriage, the son of Dionysus and Aphrodite. He was supposed always to be present at nuptial feasts, where songs were made in his honour. Any marriage not blessed by him was foredoomed to disaster.

Hymenoptera, an order of insects (*qv*) distinguished by having two pairs of membranous wings, which are interlocked by means of horny hooks, the mouth parts adapted for biting, licking, and sucking, by the presence in the female of an ovipositor used for sawing, stinging, or piercing, and by the complete metamorphosis, the larva being usually a legless grub. The Hymenoptera are divided into two suborders, the *Sessiliventres*, in which there is no marked "waist" between the thorax and abdomen, and the *Petiolata*, in which the abdomen is attached to the thorax by a narrow stalk-like waist. To the former belong the saw-flies (*qv*), and to the *Petiolata* the ichneumon flies, ants, bees, and wasps (*qv*).

Hymettus, ancient name of a mountain range, 3370 ft high, in Attica, Greece, celebrated of old for its honey and for its marble quarries. The modern name is Trelo Vouni. The Hymettian honey-bees have now migrated elsewhere. The mountain is famous for its sunset glow.

Hymns. The practice of singing chants or songs in honour of a deity or hero is older than can be estimated. The term in its modern meaning can be applied to certain ancient Greek poems, to a few classical Latin compositions by (e.g.) Catullus and Horace, and to much Hebrew literature, e.g. the Psalms. Many of the finest hymns belong to early and mediæval Latin Christianity, e.g. *Veni, Creator Spiritus*, *Dus Irae*, *Stabat Mater*. The Reformation produced in Luther

and his followers a number of great German hymnologists to whom we owe, among others, *Ein' feste Burg ist unser Gott* and *Nun danket alle Gott*. During the 16th and 17th cents several metrical versions of the Psalms were made and sung in Scotland as hymns, the best known being that of Tate and Brady (1696).

The chief English hymn writers have been George Herbert, Dryden, Addison, Isaac Watts, Bishop Heber, John Byrom ("Christians, awake, salute the happy morn"), Toplady ("Rock of Ages"), Cowper and Newton, Keble, Wesley, and J. M. Neale. The famous Moody and Sankey hymns, upon which those of the Salvation Army are modelled, popularised a new Evangelical type of hymn characterised by easily memorised tunes.

Hyndman, Henry Mayers (1842-1921), British Socialist leader. He founded the London Democratic Federation in 1881, and in the same year published *England for All*, an exposition of Marxism. His party, called the Social Democratic Federation after 1884, included among its members William Morris, Tom Mann, George Lansbury and others, all of whom were dominated by Hyndman's striking personality. The Trafalgar Square disturbances and dock strike of 1889, and Hyndman's opposition to the Boer War, gained him prominence, but in 1914 he became a strong nationalist and supporter of the Allied Cause. In 1915 he left the Socialists to form a small group of his own. A later well-known work of his is *The Evolution of Revolution* (1920).

Hyoscine (or *scopolamine*), alkaloid that is obtained from various plants of the Solanaceæ family. Strictly speaking, hyoscine is the racemic form of the levo-rotary scopolamine, but the two names are somewhat loosely interchanged. The physiological action of the optic isomers is different, inasmuch as, whilst the *l* form has a strong action on peripheral nerve-endings, the *d* isomer is devoid of activity in this



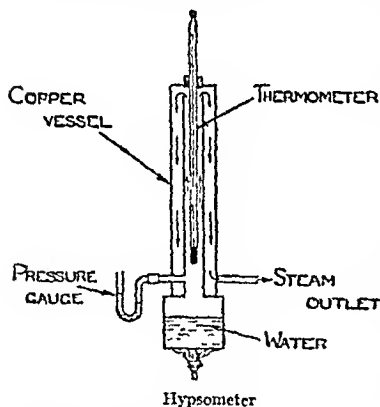
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ting the dose The skin is sterilised by painting with ether or iodine, and the needle by boiling A glass syringe with a tightly fitting ground glass or metal piston is best, and on the end of this a hollow needle is fixed The solution is placed in the syringe and the needle plunged through the skin into the underlying muscle or vein

Hypostyle [HI'POSTIL] (architecture), having columns to support the roof A hypostyle hall was a feature of Egyptian temple architecture that of Karnak being famous It was lighted by raising the central aisle to form a clerestory, or by leaving openings in the wall between the front row of columns

Hypothec (in law), a form of mortgage, under which property is assigned to a creditor to be returned when the debt is paid, hence *hypothecate*—to pawn

Hypsometer, an apparatus for



measuring the boiling-point of water by means of a sensitive thermometer, or for graduating the latter when the former is known A thermometer immersed in the steam from boiling water acquires a reading corresponding very accurately to the temperature calculated (see TEMPERATURE, MEASUREMENT OF), provided it is shielded from loss of heat by radiation The stem of the thermometer must be completely immersed in steam, since the

passage of the steam through the apparatus requires a slight pressure, the water is boiling under a pressure slightly exceeding that of the atmosphere This is allowed for by observing the indication of a small U tube gauge containing water.

Hyracoides, an order of Mammals (q v) containing a few existing species of ancient lineage, probably representing the stock from which the orders of Ungulate Mammals trace their descent In the presence of a wide gap between the front and the back teeth, the dentition somewhat resembles that of the Rodents, there are two pairs of lower incisors with closed roots, and the cheek-teeth are like those of a rhinoceros in number and structure Moreover, the toes, of which there are four in front and three behind, are tipped with hoof-like nails The order possesses a number of structural peculiarities which prevents its close affiliation with any other order of Mammalia Fossils of this order, differing but little from existing species, except that the teeth are more primitive, have been found in Upper Eocene beds in Egypt

Hyrax, the old but incorrect name for the Mammals of the order Hyracoides (q v), which are now known as *Procavia* They have no popular name, but are the creatures designated coney in the Bible They are about the size of rabbits, and somewhat resemble them in appearance, but have short ears and hind legs and no definite tail There are two distinct kinds, differing in habits, the best known being the *Rock-hyraxes* which live in rocky hills in S and E Africa and Arabia They feed upon plants of various kinds, and are extraordinarily active The other kind, the *Tree-hyraxes*, inhabit the forests, principally in W Africa, and feed upon foliage.



Hyrax

seldom coming to the ground but sheltering in hollow trunks

Hyssop a perennial shrubby plant belonging to the large and widely distributed family Labiate. The plant is c 2 ft. high with long narrow elliptical leaves and bluish flowers in spikes. It is a native of Siberia and the mountainous parts of Austria and is cultivated in gardens among culinary potherbs flowering from June till Sept.

Hysteresis a word derived from the Greek meaning lagging. It was originally applied to the lag exhibited by iron when exposed alternately to magnetising and demagnetising forces but is now applied to other phenomena of a similar character. Magnetic hysteresis is fully characterised by what is called the BH curve of iron (see Fig). If we place an unmagnetised piece of iron in a magnetising coil apply a small magnetising current and measure the magnetism produced we obtain a certain value for the latter. If we then increase the magnetising current step by step measuring each time the magnetism we can obtain the curve OA representing the relation between these two. At any point we can reverse the process and decrease the magnetising current step by step. We then find that the magnetism does not retrace its steps. When we finally reach zero magnetising force the point C we find that the iron still contains some residual magnetism represented by OC which is eliminated only by a considerable magnetising current applied in the opposite direction. We can go on increasing the current in the opposite direction to the point D until we have obtained a reversed magnetism equal to that originally attained and then proceed to decrease the current and so on. The result is a so-called *hysteresis loop* the area of which can be shown to be a measure of the loss of energy involved in putting the iron through one complete cycle. It is evident that the loss is greater in proportion to the number of cycles per second for this reason the losses in

alternating-current transformers (*qv*) and other apparatus increase as the frequency increases.

If a material is subjected to elastic stress (see ELASTICITY) we get similar curves for the strain produced when plotted against the stress. The area of the curve again represents loss of

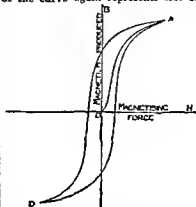


FIG. 10.

energy which appears as heat. Di electric stress that is to say subjection of a material to an electrostatic field exhibits analogous phenomena. Hysteresis in fact tends to be a term used where the behaviour of a material depends not only upon certain intrinsic properties but on its past history.

Hysteria, a functional nervous disorder accompanied by extreme emotional excitability and loss of will power. The disorder was formerly believed to be almost confined to young women but it is now known to attack human beings of either sex and of almost any age. A comparable affection in dogs and other animals is given the same name (see PSYCHO-ANALYSIS).

Hythe, one of the Cinque Ports and a seaside resort Kent. The School of Small Arms formerly known as the School of Musketry is situated here. Pop (1931) 8400.



"LINDBERGH PEAK"
UTM Colorado Mountain, *senamid sicut* 192
American edition

and W hemispheres and an occasional visitor to England which is brownish with a green and purple lustre and the scarlet ibis the handsomest of all which inhabits America

Ibn Gabirol *see* AVICENNON

Ibn Saud (*ib n Saud*) Abdul Aziz III of Nejd (*b c* 1881) King of Hejaz He was driven from Nejd by a rival dynasty but in 1901 made a surprise return and was proclaimed Sultan of Nejd He overcame all his rivals and the Turks in 1908 and 1913-14 unsuccessfully tried to aid Britain in the World War and thereafter was bent on enlarging his kingdom In 1944 he annexed the Hejaz and became its king in 1946 the enlarged dominion being now officially known as Saudi Arabia He is friendly to Britain

Ibsen, Henrik Johan (1828-1906)



Henrik Ibsen.

Norwegian playwright and poet His works may be divided into three groups. Firstly the early sagas and historical dramas mostly written in verse which include *Lady Inger of Ostr* (1834)

The Warriors of Helgeland (1838) *The Pretenders* (1864) and *Emperor and Galilee* (1873) Secondly there are the poetic fantastic plays *Brand* (1866) and *Pee Gynt* (1867) Thirdly and most important the satirical prose dramas dealing with problems of social and individual conduct These include *League of Youth* (1869) *Pillars of Society* (1877) *An Enemy of the People* (1889) *Rosmersholm* (1896) *The Doll's House* (1890) *Ghosts* (1881) *The Wild Duck* (1884) *Hedda Gabler* (1890) *The Master Builder* his masterpiece (1897) and *When We Dead Awaken* (1900) All these plays advocated the development and expression of individuality and in

their treatment of this motive and in their superb dramatic technique deeply influenced modern drama Wm Archer translated the plays into English 1890-1903 *See also* SCANDINAVIAN LITERATURE

Icarus [*i xōrōs*] in classical mythology the son of Daedalus (*q v*) When he and his father escaped from Crete by flying Icarus flew too near the sun which melted the wax that bound the feathers of his wings and he fell into the Aegean Sea

Ice compact frozen water colourless and crystalline It is lighter than water because when water freezes it expands and hence the ice has a greater volume

Ice has been classified into two kinds according to its mode of origin snow ice and water ice Snow ice results from the compression and alternate melting and freezing of fallen snow and is again subdivided into névé ice and glacier ice

Névé ice is formed from the melting of snow on mountain slopes which refreezes into a granular mass and when this granular névé slowly slides down into the valleys below it becomes more compact and crystalline and is glacier ice—colourless or white in small pieces bluish in large masses Snow ice covers most of the higher mountains and towards the poles descends towards sea level and if it reaches the sea fragments may break off as icebergs (*q v*)

Water ice is formed by the freezing of the surface of fresh water or of the sea Sea water even when perfectly still has on account of the salt in solution to be cooled to a temperature of *c* 28° F before it will freeze where as fresh water freezes at 32° F When ice is formed from sea water the salt remains in the liquid water the ice being practically free from salt

Ice-ages (or *Glacial Periods*) are phenomena records of which have been observed in different areas at various periods of the earth's history arising from conditions somewhat resembling those of the Polar regions to-day In addition to the Pleistocene

Iambic

Iambic [I'AMBIK], *see* VERSE

Iasi, *see* JASSY

Ibadan, native city in Yorubaland, British W Africa, is situated *c* 120 m N of Lagos, with which it is connected by rail. It is said to be the largest native city in the sub-continent. The bulk of the negro inhabitants are cultivators, many of them, however, are also engaged in domestic industries. It is a distributing centre for S Nigerian raw cotton and tobacco. A British Resident advises the native administrators. Pop., including suburbs, *c* 240,000.

Ibáñez, Vicente Blasco, *see* BLASCO-IBÁÑEZ, VICENTE

Iberian Peninsula, the name given to the SW peninsula of Europe jointly occupied by Spain and Portugal (*qq v*). The peninsula forms a clearly defined geographical unit S of the Pyrenees. The name is derived from the Latin for the Ebro (*Iberus*), which was extended to the inhabitants near-by and eventually to those of the whole peninsula. Area, *c* 230,500 sq m.

Iberians, the inhabitants of Spain in ancient times, more especially those tribes living near the Ebro. Very little is known about them. The term is also used to denote a primitive race which appears to have occupied N Africa and W Europe, possessing as common characteristics smallness of stature and long skulls. The early Welsh are among the people who, it is suggested, were Iberians.

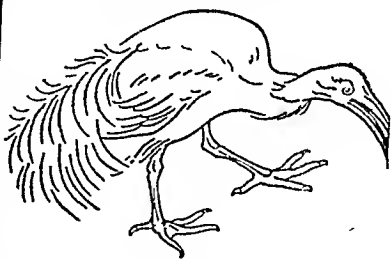
Ibex, wild species of goats (*qv*), ruminant Mammals related to sheep, but distinguished from them by the absence of the scent glands between the hoofs and on the face in front of the eye, and by possessing a beard on the chin and a strong odour, especially in the males.

I

Eight wild species are known from the mountain ranges of S Europe, the Caucasus, central and S W Asia, Nubia, and Abyssinia. Of these the most important, as being the ancestor of domesticated breeds, is the ibex of Asia Minor and Persia, which in the

structure of its horns and other characters is very like a typical tame goat, and is known to have inhabited Greece during historic times.

Ibis, name for several species of birds about the size of curlews, with a similarly curved but stouter bill, but not related to them, being akin to the storks and spoonbills (*qq v*). They are wading birds, feeding upon shellfish, insects, and small reptiles. The best-known species are the sacred ibis



Ibis.

of Egypt, which is mainly white with a black naked head, the glossy ibis, a species widely distributed in the E

Ibis

can be utilised in other freezers. Water ices and custard mixtures do not freeze well and become granular unless $\frac{1}{2}$ oz of gelatine is added to a quart of mixture. For iced puddings special moulds with tightly fitting lids are needed, the whole being inserted in a mixture of salt and ice.

For iced soufflés an iced cabinet is necessary consisting of a cupboard with shelves and a space in the walls for inserting the freezing mixture.

Vanilla Ice-cream is made as follows

- 1 pint milk
- 1 oz cornflour
- 3 oz sugar
- 1 egg
- Vanilla essence

Mix cornflour to a paste with a little cold milk. Boil remainder and add to blended cornflour. Boil for 5 minutes. Add to sugar and beaten egg. A more expensive ice-cream can be made by substituting cream for some of the milk. Variations can be made by adding other flavourings: nuts, almond, toffee and syrups and sauces such as mint and chocolate.

Ice-cream Terms

Ices or Water Ices fruit juice, sugar and water.

Sherbet water ice partially stiffened with gelatine on whites of eggs.

Sorbet *Granita* or *Punch à la Roman* a half frozen water ice made from fruit juice, water and sugar to which white of egg, liqueurs or rum are sometimes added. It is served before the roast in a full-course dinner.

Frappés partly frozen ice.

Soufflé Glacé fruit cream egg yolks whipped white and sometimes gelatine served in soufflé cases.

Mousse flavoured whipped cream sugar and sometimes white of egg frozen without stirring and served in a soufflé mould.

Pâtis cream sugar and egg whites with or without fruits, nuts and flavourings.

Bombes mixture of 2 or 3 layers of ice or ice-cream frozen in a mould.

Sundaes plain ice-cream syrup of fruit or nuts. See also REFRIGERATION.

Ice Hockey see HOCKEY.

Iceland, large volcanic island in the extreme N of the North Sea c 500 m N W of Scotland in the N touching the Arctic Circle some 750 m E of Greenland. The surface is rugged consisting of a series of extensive glaciated plateaux with an average elevation of some 1700 ft. The highest point is Orfa Jokull (8400 ft). There are c 90 volcanoes which have been active within the historic period, the most celebrated is Mount Hecla (c 5100 ft). Altogether there are several thousand volcanic craters and geysers and hot springs occur everywhere. Only the S coast is even and here and in the S W are the principal lowlands; elsewhere the Icelandic shores are penetrated by deep fiords. Habitation is almost entirely confined to the coastal lowlands; grass is the only vegetation save the usual Arctic types. Cattle breeding and fishing are the principal industries.

Since 1918 Iceland has been united to Denmark by a purely personal union. The King of Denmark is King of Iceland, but the Icelandic Government is distinct from that of Denmark. The Icelandic Parliament known as the Althing consists of two houses to which ministers are responsible. The executive power is vested in the King. The capital is at Reykjavik which in 1931 had 28 800 inhabitants. Area 39 710 sq m. pop. estimated (1931) 109 000.

History Iceland was discovered in the 9th cent. A.D. by the Vikings, though immigration from Scandinavia and Ireland seems to have begun earlier and continued during the early Middle Ages. The islanders were organised in the rude semi-tribal independence peculiar to the Scandinavian races at this period. In the 10th cent. the Althing was established with some authority over local moots or assemblies. After enjoying a republicanism for several centuries Iceland submitted to the King of Norway in 1637. When

débris, which mantled the ground, and was incorporated into a frozen sludge by the alternate melting and freezing of the snow with the changing seasons. This sludge, mostly local, is called "*Head Rock*" or "*Combe Rock*," and occurs at various heights, thus ruling out the possibility of its being water-deposited. "Dry valleys," characteristic of the Glacial Period, were cut by water flowing at much higher levels than now. "*Terrace-gravels*" are extensive deposits of gravel along the sides of the main valleys in the extra-Glacial area. These are flood deposits, due to thawing of the ice in the glaciated region to the N and brought down by tributaries of the Thames and other rivers. Another effect of the glaciation was to change the sea-level several times, partly through the abstraction of great masses of water in the ice sheets, but more certainly by the great weight of the ice which led to a sagging of the earth's crust beneath. The extent of the depression is shown by *raised beaches*. A typical raised beach is a platform of rock cut by the waves, but at the present time above the level of the sea. It proves the sea to have been of a higher level at the time of its formation than it is now. A late-glacial raised beach in Scotland, at 100 ft above sea-level, shows the extent to which the heavy ice load depressed the country. Another in Sweden indicates that the land there was 900 ft lower in the Glacial Period than it is now, and it has been calculated that it rose at a rate of 1 ft in 22 years after the removal of the weight of the ice.

Iceberg, a mass of ice which becomes detached from an ice-sheet or glacier as it enters the sea and may drift a considerable distance, according to the winds and currents, from its point of origin. Only $\frac{1}{4}$ of the mass appears above the water, but, even so, icebergs may be 300 ft high. In the Antarctic, where they break off from the great circumpolar ice sheet, they are especially large, and are often flat and tabular in shape. In shallow water

they often drag along the bottom, causing some erosion, and when driven by a gale may break quite large rocks, which they strike. They may, by drifting into warmer latitudes, become dangerous to navigation, as was exemplified by the loss of the *Titanic* through striking an iceberg, in 1912. Icebergs often carry débris, which they distribute on the sea floor as they melt.

Ice-breaker, a specially constructed ship for the purpose of forcing a passage through ice-bound waters. It is made, not only to break up the ice directly, but also to slide on to the ice and break through with its weight. Most of the ports of N Europe employ ice-breakers continuously during the winter months.

Ice-cream, a compound of flavoured cream or custard, served frozen. The simplest method of making ices or ice-cream is in a jam-jar or similar vessel, surrounded by a freezing mixture. Frequent stirring is necessary to produce an even consistency, free from ice granules. The best freezing mixture for most ice or ice-cream consists of 4 parts of ice to 1 of salt, or 6 parts to 1 for slow freezing, such as for milk puddings. Chop the ice into small pieces, and make alternate layers of salt and ice. The larger the proportion of ice to salt the quicker the freezing, and the more granular will be the consistency of the ice-cream. In a freezing churn, the cream is in a metal container and is stirred constantly for 10-20 minutes so that an even, soft cream is produced. Another freezer consists of a metal cylindrical container having an inner and outer compartment. The ice-cream mixture is placed in the inner space, opening at one end, and the freezing mixture in the larger, opening at the opposite end. Occasional renewal of the position of the container, and scraping from the sides to the middle of the ice-cream mixture is all the labour entailed, but the cream thus produced is somewhat granular.

Domestic refrigerators make ice in the drawers, and this, chipped small,

period when it was practically uninhabited a revival set in and it is now a marketing centre for the surrounding area and the seat of the important Konia carpet industry. *See* Konia.

Iconoclasts, Image breakers a powerful Christian party opposed to the religious use of images which arose during the 8th and 9th cents. The practice of exhibiting images of Christ and the Saints introduced c. A.D. the 3rd cent. met with great opposition in the Eastern Empire under Leo III (the Isaurian) who issued an edict in 726 prohibiting the worship of all images and 2 years later a second edict commanded their destruction. The attempt of an official to destroy a statue of Christ caused insurrection which spread to Greece and the Aegean islands. Pope Gregory II denounced Leo III's edict and rulers of Church and State fell into severe conflict. A council at Constantinople in A.D. 786 had to be dissolved on account of the violence shown but met again at Nicaea c. 6 weeks later and agreed on the legitimacy of the use of images. In 814 a council at Constantinople reversed this decision but a further council at Constantinople in 842 accepted the decrees of Nicaea and denounced the Iconoclasts.

Idaho inland State of U.S.A. situated W. of the Rocky Mountains having Oregon and Washington to the W. British Columbia and Montana to the N. and Utah and Nevada to the S. The State is watered by the Snake and Salmon Rrs. The interior is mountainous culminating in Mount Hyndman (10,780 ft.) but there are a number of extensive plateaux. The resources of Idaho are being developed slowly. Cattle, cereals, lumber and fruit are most important products. Minerals are a valuable resource—gold, silver, lead, copper and zinc. The climate is dry and stimulating, warm in summer and cold in winter. Education is particularly well advanced. There is a university at Moscow and a college at Caldwell. The State capital

is Boise. Area 83,888 sq. m. pop. (1930) 445,039.

Idealism, in modern philosophy, a conception which regards the subject and object of experience as inseparable and interdependent. Hence it follows that nothing is intelligible or existent except through mind nor is the mind in itself existent except in relation to the object conceived. The notion of idealism is much older than Plato but it was he who approached closest to the modern conception. He taught that subjective experience and the universe were a complete and indivisible system but the mind existed in relation to an all-embracing experience or standard outside itself.

The later Idealists from Descartes onwards gradually withdrew from the hypothesis of an all-pervading standard which had formed so general a feature of medieval religious speculation and sought for understanding in an investigation of individual sense experience. Notable amongst these were Leibnitz, Locke, Kant, Hegel and Berkeley.

CONSULT F. H. Bradley *Appearance and Reality* (1893); G. M. Joyce *The World and the Individual* (1901); G. P. Adams *Idealism and the Modern Age* (1919).

Ides, in the ancient Roman calendar the name of a fixed day in each month falling on the 15th of March, May, July and Oct. and on the 13th of the other months. The Ides of March are celebrated in history as the date upon which Julius Caesar was assassinated. 44 B.C. *See also* CALENDAR.

Ideoplastic Theory *see* PSYCHICAL RESEARCH.

Idiocy (or *Idiotcy*) a state of mental enfeeblement the result of arrested brain development before birth or in very early childhood. The chief forms are (1) *genetous* the most usual type which begins before birth and is due to parental insanity, epilepsy, syphilis or alcoholism; (2) *epileptic* in which epileptic fits accompany the idiocy; (3) *paralytic* resulting from an apoplectic attack in early infancy or injury.

to the head in the act of birth; (4) *hydrocephalic*, characterised by a deformed and enlarged head, (5) *microcephalic*, accompanied by great diminution in the size of the head. Imbecility is the name given to the milder forms of idiocy, accompanied by less mental enfeeblement, but in all cases the degree of derangement varies. Some idiots and imbeciles can be taught to earn their own living in special institutions, while others are mere automata, dumb, or uttering meaningless words, and incapable of feeding or clothing themselves. Idiocy and imbecility are frequently accompanied by bodily defects, such as blindness or deafness, rickets, bad teeth, defects in speech, and inability to walk properly. Most idiots die at an early age.

Ido, an international language, a simplified form of Esperanto (*qv*), put forward by MM Couturat and de Beaufront in 1907.

Idolatry, the worship of idols or images supposed to be the abode of a superhuman personality. It was practised in some form or other by all ancient nations. The earliest Biblical mention of idols occurs in Gen xxxi 19 and 30. The Old Testament shows that the Jews frequently lapsed into idolatry. The worship of Baal, representing the male principle, and Ash-toreth the female principle in nature were features, as were nature worship and totemism (Ezek viii 10), and household gods. In the New Testament, Jesus Christ does not allude to idolatry, although St Paul on several occasions refers to it (Rom i 18-32). Constantine I ordered the destruction of idolatrous temples in 330, and Honorius abolished idolatry throughout the Roman Empire in 404.

Idyll [*idil* or *idil*], literally "a little picture of life," and applied in this meaning by Theocritus (*qv*) to his poems. Through its association with pastoral poetry it has come to connote a literary or artistic representation of Arcadian simplicity or charming guilelessness, which has little relation to

the realities of life. The term was rather misused by Tennyson in his *Idylls of the King*, where it can mean little more than "episodes."

Ignatius, Saint, Bishop of Antioch, and an apostolic father. Little is known of him, but he died probably between 112 and 120. His epistles, which have been preserved in three recensions, have occasioned a great deal of controversy; they were written variously in Greek, Latin, Armenian, Coptic, and Syriac. They were in defence of Episcopal authority, and attacked Judaism.

Igneous Rocks are formed by the consolidation of molten magmas, and differ according to the composition of the magma and to the conditions attending its consolidation. The composition is to a certain extent indicated by the minerals contained in the rock, both as regards nature and relative abundance.

Igneous rocks are chiefly compact and crystalline, occasionally glassy, and generally occur in irregular masses, though they are sometimes intruded as sheet-like bodies with parallel sides. They are in process of formation to-day in association with volcanoes, and no doubt the first crust of the earth was composed of igneous material. They are divided primarily into three groups: *plutonic* or *abyssal*—those that have cooled slowly at a great depth and possess a coarse crystalline structure, and occur in large masses, *hypabyssal* (*qv*) or *dyke* rocks—those that have been more rapidly cooled by being intruded nearer the surface as dykes or sills, and may be glassy in texture; and *volcanic* or *superficial*—those that have been poured out at the surface and rapidly cooled with little chance to crystallise, and are therefore fine-grained and glassy, but may show structures due to a flowing movement, and cavities formed by steam and gas. Under these three main headings the various rock-types are grouped according to their mineralogical and chemical composition, the arrangement usually

CLASSIFICATION OF IGNEOUS ROCKS

<i>D i s s i m .</i>	<i>S i l i c a Percentage.</i>	<i>Chief Minerals</i>	<i>P l a t i n i c Representative</i>	<i>H y p o t h e t i c a l Representative</i>	<i>V o l c a n i c Representative</i>
Acid	Over 66	Quartz Orthoclase Felspar Mica	Granite	Quartz Porphyry	Rhyolite Obsidian Pituiton Trachyte
Intermediate-subacid	66-53	Orthoclase Mica Hornblende Felspar	Syenite	Porphyry	
Sub-basaltic	53-42	Hornblende Felspar Hornblende Felspar	Diorite	Porphyry	Andesite
Basaltic	Less than 42	Plagioclase Apatite Olivine Olivine Apatite	Gabbro	Diorite	Basalt
Ultra-basaltic	Less than 32		Serpentine	Picrite Peridotite	Limburgite

being based on the percentage of silica in the rock

Ignis fatuus, see WILL-O-THE-WISE

Iguana, a name properly restricted to several large arboreal lizards found in tropical America but commonly applied in India and Australia to the large ground lizards usually called Monitors (*q v*) which belong to a distinct family. The true Iguanas are 2 or 3 ft in length but the tail is



Iguana.

are said to be excellent eating. They belong to a family the Iguanidae which contains numerous American species including the Basilisk the Horned Toad (*q q v*) and others.

Iguanodon a fossil reptile of the Dinosaur (*q v*) group occurring in the European rocks of Jurassic and Lower Cretaceous age especially in those of the Wealden formation. It was a land animal heavily built, and walked on its hind legs supporting itself on its thick tail. It had a small head and fore-limbs.

ground feeding on vegetation. It attained c 25 ft in height. Its remains are common in the Weald of Kent and Sussex and in Belgium. See also REPTILES.

Ile-de-France, former province of France in the departments of Seine Seine et Marne Seine et Oise Nièvre Somme Aisne and Oise. It was the central province in the later Middle Ages with Paris as its capital. The larger part of the domain lands of the House of Capet were within the area later occupied by the province. The name was also formerly applied to Mauritius (*q v*).

Iliad, see HOMER.

Ilium, see TROY.

Illegitimacy see AFFILIATION.

Illium, also sometimes known as florentium a metal belonging to the group known as rare earths (*q v*). It was the last of the rare earth metals to be discovered and the pure metal has not as yet been isolated. The known characteristics of illium are given in the article ELEMENTS.

Illinois, central State of U.S.A. Immediately W. of the Mississippi R. having the Ohio l. on the S. Wisconsin and Lake Michigan on the N. and Indiana on the E. The State is a low land comprising a section of the very fertile moraine soil of the middle West. It is a very well watered especially by the Illinois R. It is the chief agricultural State of the U.S.A. and industry is highly developed. There

swampy

are over 12,000 m of railway, and water transport is also important. A large coalfield is situated in the State. The industrial products are iron and steel, coal, petroleum, and zinc sheet. The wheat crop in 1931 amounted to 45 million bushels. Other crops are Indian corn, oats, and barley. The meat-packing and printing industries are also very important. The largest city is Chicago (*qv*) (3,350,000), the second city of U.S.A., the State capital is at Springfield (*qv*). Area, 56,660 sq m, pop (1930) 7,630,700.

Illumination, see PHOTOMETRY

Illumination of Manuscripts, the ornamentation of written or printed works by means of coloured or gilt pictures or designs dating back at least to the fragmentary *Iliad* vellum manuscript in the Ambrosian Library at Milan, written in the 3rd or 4th cent., and reaching its richest development during the Middle Ages. It developed from attempts to illustrate manuscripts by means of miniature drawings representing scenes and persons mentioned in the text. To these were added, in the Byzantine period, a profusion of gold and silver lettering and rich design. The Celtic Irish monks were famous masters of the art, and added to it a degree of minute precision and a fuller development of intertwined designs (*e.g.* the Lindisfarne Gospels in the British Museum). The Carolingian or Franco-Lombard illustrators were noted for their generous use of gold and for their concentration on the development of decorated initial letters (*e.g.* the *Evangelarium* in the Harleian MSS of the British Museum).

The drawing of scenes from the text eventually gave place to the mere decoration of the text in the form of a rich border or frame of intricate coloured design, in which the use of gold was reduced to a minimum. These illuminations have a more restrained and consciously artistic beauty than the earlier more florid decorations, and where the representation of scenes and persons was retained, the drawings

were less crude and more faithful to life. The death-blow was given to this art by the invention of printing, although it survived for at least a century, both in its true form (the beautifying of *written* texts), and in the ornamentation of *printed* works also. The Bedford Book of Hours in the British Museum is a good example of 15th-cent illumination. See *Manual of Illumination* (Bradley), and *Illumination and its Development in the Present Day* (Farnworth).

Illustration, a painting, drawing, photograph, or print which explains, decorates, or amplifies a literary work. It is possible to regard almost all plastic art as illustration. The early cave paintings of Altamira illustrate the episodes of the hunt for food, the Assyrian stone-reliefs illustrate episodes of lion-hunts and of battles, Greek sculpture illustrates Greek mythology, Italian painters show incidents of the Holy Scriptures, while historical painters, battle-painters, the subject-painters of the Royal Academy are all illustrators in this sense. The term, however, is more generally applied to pictures reproduced by mechanical processes, and incorporated in the books and periodicals which they decorate or explain, and the earliest illustrations in this sense are the decorations of ancient manuscripts and of the first printed books. To-day illustrating has become a considerable industry. Many elaborate editions of classical works aim at making the decorative quality of the illustrations as high as the standard of the writing, and these books are frequently highly artistic. Other illustrations, while of no great artistic value in themselves, express so excellently the spirit of the works which they accompany that they perform a very definite service. Tenniel's drawings for *Alice in Wonderland* may be classed among these.

There are also produced to-day thousands of cheap books and periodicals in which illustration plays an important part, often aiding both

child and adult by making reading more easy and pleasant.

Illyria, district in the N W of the Balkan Peninsula bounded on S W by the E Adriatic and defined mainly by racial boundaries. The name was applied by the ancient Greeks to the land of contemporary barbarians N and W of Macedonia and Epirus. The Roman province of Illyricum was an administrative unit varying in extent from time to time. The district is now occupied by part of Yugoslavia (including Dalmatia, Bosnia, Herzegovina and Montenegro and part of W Serbia) and the N of Albania.

Image-worship see **ICONOCLASTS**

Imam [IMAHM] from the Arabic pattern or example a Moham-
medan religious leader. He may be a Caliph one of the four great doctors of the four orthodox sects or merely any officiating leader in a mosque.

Imitation of Christ, The (*Imitatio Christi*) a devotional Christian work written in the 14th or 15th cent. and ascribed though not with the greatest confidence to Thomas à Kempis (q.v.). It is mystical in character but lucid in style.

Immaculate Conception, The, the dogma of the Roman Catholic Church that the Virgin Mary was from the first instant of her existence preserved from all stain of original sin. The doctrine caused a bitter dispute which raged in the Church for nearly 600 years. About 1140 the Franciscans supported and the Dominicans opposed the dogma. In 1381 the discussion was revived at Paris by John de Montesono a Dominican, resulting in the exclusion of the Dominicans from the University in 1349. It also occasioned great discussion during the pontificates of Paul V (1600-21) Gregory XV (1621-3) and Alexander VII (1655-67). It was made an article of faith in the Roman Church by a Bull promulgated by Pius IX on Dec. 8 1854.

Immortality (Lat *in* = not *mors* = death = mortal from *mors* = death) the

belief in the continued existence of the soul after death which in one form or another is widespread and almost universal. The belief can be traced in primitive religions and as in the case of the more advanced creeds plays an important part in the formulation of their philosophies. The body is the physical vehicle for the soul and when the state known as death sets in the spiritual part of man the soul lives on for further development and realisation. Socrates' belief in the immortality of the soul is expressed in the *Phaedo* and the *Phaedrus*. The view that death is not the end of all things is expressed roughly in the Egyptian *Book of the Dead* directions are given to the departed soul as to what it may or will encounter in the world beyond and how it may emerge triumphant from various tests. Most religious beliefs include an actual world or state where upon the death of the body the soul may reside. The future life is not greatly stressed in the Old Testament and though there are few details available the Hebrews believed in Sheol a cavern beneath the earth, where the spirits of the dead resided. A hint of the theory of the Resurrection seems to be given in Is. xvi. 19.

In the Apocrypha the concept of immortality is developed but the idea of individual life after death and the resurrection of the body finds its fullest expression in the New Testament. In the gospels the teaching of Jesus Christ frequently refers to eternal life. The subject is one of the main themes of His mission and amongst others is dwelt upon extensively by St Paul e.g. in 1 Cor. xv. 41.

Impala, elegant handsome antelope with lyrate horns found in Africa and resembling a large gazelle but differing by having glands on the back of the hind fetlocks and not between the hoofs. Probably no antelope can equal the impala in general activity and leaping power.

Impeachment, the prosecution by

the House of Commons before the House of Lords of a commoner or peer for treason or other high crimes and misdemeanours. The practice dates from the reign of Edward III. One of the various ways in which the Commons tried to obtain control over the conduct of the ministers of the Crown, it lost its value when the development of the principle of ministerial responsibility gave them that control. Before that time, however, much abuse had already occurred, many persons being impeached on trumped-up charges whose real guilt lay in their political opinions. The last two impeachments to occur were those of Warren Hastings in 1788 and Lord Melville in 1806.

Imperial Conference. In 1887 the Prime Ministers of various Dominions gathered in London at the Jubilee of Queen Victoria. Similar meetings took place at various dates between 1897 and 1907, when the gathering became known as the Imperial Conference, and was presided over by the British Prime Minister. During the War, it was called the Imperial War Conference, and in 1921 an Imperial Premiers' Conference was held and repeated in 1923, 1926, and 1930. A special Imperial Conference was held at Ottawa in 1932 for the discussion of inter-imperial trade and tariffs. See OTTAWA AGREEMENTS.

Imperial Institute, S Kensington, was founded as a national memorial of the Jubilee of Queen Victoria, with the object of promoting the exploitation of the Empire's resources, and was opened in 1893. The exhibits are arranged in courts, each representing a dominion or colony. From these displays a good impression of the resources, industries, scenic characteristics, and manner of living of the inhabitants of each country is obtained.

Imperialism, a term used in various senses, most often for the doctrine of territorial expansion and self-sufficiency as applied to national policy. Generally, however, it embodies in this country the political and economic

theory that the British Empire is a self-sufficient economic unit, capable of existing as an interdependent federation of nations. This idea evolved out of the teaching of Lord Beaconsfield that the Colonial constitutions were to be regarded as consolidating rather than disintegrating factors. In 1884, on the Liberal Government's initiative, the Imperial Federation League was set up, and a conference called in London, under the presidency of Lord Rosebery. Under Chamberlain's administration at the Colonial Office, further conferences were organised, and Chamberlain carried on a vigorous campaign against the "Little-Englander" school, which denied all imperialist economic interdependence in favour of Free Trade doctrines. In 1900, during the Boer War, he successfully invited the co-operation of the Colonies in the struggle. As the final result of years of propaganda by the Chamberlain school, and in an effort to assure imperial consolidation, the first of the Imperial Conferences (*q.v.*) was constituted by a resolution of the Colonial Conference of 1907. A definite constitution was framed for the Conferences, and four-yearly meetings were provided for. This Conference reaffirmed the principle of preferential trade within the Empire, the only voice of dissent at that time being that of the United Kingdom. See also OTTAWA CONFERENCE.

Imperial Preference, see TARIFFS, EMPIRE TRADE, OTTAWA AGREEMENTS.

Imperial War Museum, S Kensington, was originally housed in the Crystal Palace, where the exhibition was opened by H.M. the King in 1920. It was removed to its present situation in 1924. The museum contains a complete and varied collection of exhibits relating to the World War: arms, trophies, uniforms, maps, models, and thousands of photographs forming a vivid record of the war years in all their aspects. One section specially commemorates the work of women. A reference library of many

thousands of volumes is available to the public

Impetigo contagious condition in which vesicular spots appear on the skin generally on the face scalp and hands and rapidly become pustular After a few days the spots dry up leaving yellow crusts The causal germs are the streptococci but the spots usually become secondarily infected by the staphylococci Adults are rarely affected the disease is one of childhood and appears occasionally as *scrupulous* among school boys

Import Duties Advisory Committee a committee set up in 1937 under the terms of the Imports Duties Act of that year to investigate the need for increasing the general rate of 10 per cent on products which can be produced in the United Kingdom and to advise on the desirability of removing from or adding to the free list or of suggesting regulations for granting drawback *ie* refunding of duties when goods are used for producing finished manufactures which are exported The recommendations of the committee are considered by the Treasury and the Board of Trade or Minister of Agriculture and if accepted the recommendations are embodied in an Order in Council the provisions of which come into force immediately Each order must be laid before Parliament and if not approved within a specific period it lapses The committee consists of three members the chairman up to the present time (1933) being Sir George May who was chairman of the Economy Committee of 1931

Imports and Exports *see* BALANCE OF TRADE FOREIGN TRADE

Impressionism, the conveying of a truly realistic impression of light and atmosphere in a painting by basing the colours on those of the spectrum was the result of various influences among which the paintings of Constable and Turner and Chevreul's scientific analysis of colour are worth noting The palette used was composed of the colours of the spectrum and has

been called the spectral or prismatic palette By these means the Impressionists succeeded in their chief aim of securing the permanent record of a fleeting and momentary effect They were concerned primarily with various aspects or appearances of a scene and the ever changing effects of light and atmosphere Colours were not mixed on the palette but were placed side by side on the canvas to be blended by the eye at the requisite distance This strictly logical exploitation of scientific theory had entirely successful results The works of Monet whose paintings were the first to earn the epithet by which the school became known glowed with a luminosity that was new in painting No effect of light was too subtle or fugitive to be captured and recorded by this new technique

Other leading Impressionists were Camille Pissarro and Renoir in France and Sickert and Wilson Steer in England Degas and Whistler were influenced by impressionism and Seurat though he concentrated on design to achieve a more static effect than that of the usual Impressionist painting demonstrated the logical conclusion of the technique of Monet and his colleagues by inventing pointillism (*see* PAINTING) a method which he used in his greatest works Seurat and Signac with a similar technique were however Neo Impressionists The implication of the limitations of Impressionism which their work represents was made explicit by later artists of the reactionary period of Post Impressionism (*q v*) Nevertheless the influence of the first Impressionist paintings based on scientific fact and carried out with brilliant talent and true genius was world wide and lasting

Impressment, the practice of enlisting a citizen in the service of the State by force Conscription (*q v*) and the calling up of militia are modified forms of impressment Impressment has been sporadic in England but Welshmen were often forced into service by the Lords of the Marches and

Lords Deputy under the Plantagenets Elizabeth and Charles I raised armies thus, as did the Parliament when it organised the New Model Army. In 1770 many rogues and vagabonds in London were pressed into the Army. The Navy was largely recruited by the efforts of press-gangs in the 17th and 18th cents, beggars and vagabonds being particularly subject to their attentions. The result of pressing criminals and other desperadoes was to make the fleet subject to mutiny, and the practice was discontinued after the end of the Napoleonic Wars.

Imprisonment, see PRISON

Inbreeding, the mating of individuals closely related by descent, has for centuries been regarded as deleterious to stock. This view was based partly on observation, particularly on the elaborate devices produced by many plants to avoid self-pollination. On the other hand, peas, beans, and some other flowers are normally self-fertilised, and yet seem to have suffered no ill-effects. Experiments with rats show that healthy individuals may be produced by constant inbreeding for several generations. When such inbred individuals are mated with others not closely related, the next generation is markedly more vigorous, and usually better developed, is better able to resist disease, and is more prolific.

The great disadvantage of inbreeding is that in fertilisation a number of genes ($q v$) for recessive characteristics are brought together, and consequently the characteristics become manifest, whereas with outbreeding, the recessive characteristics are much more likely to be paired with dominant ones, and hence to remain latent. Many recessive characteristics seem to be harmful. Resistance to disease, for instance, in many cases seems to be dominant, and non-resistance is much more likely to appear in inbred stock. Breeders wishing to obtain any particular recessive characteristic may procure it by inbreeding, but to maintain the vigour of their stock, out-

breeding is at least occasionally necessary. Races continuously inbred diminish in number, and usually die out. See also EVOLUTION, GENETICS; HEREDITY, MENDELISM.

Inca Civilisation. The Incas were a Peruvian tribe, which, originating in the Cuzco Valley, spread over most of Western S. America from Quito to Central Chile. The name Inca was also applied to the ruling house or caste of the tribe. According to Inca legend, they were led from the S. to the Cuzco Valley by a mythical chieftain, Manco Capac. They first emerge historically at c. A.D. 1100.

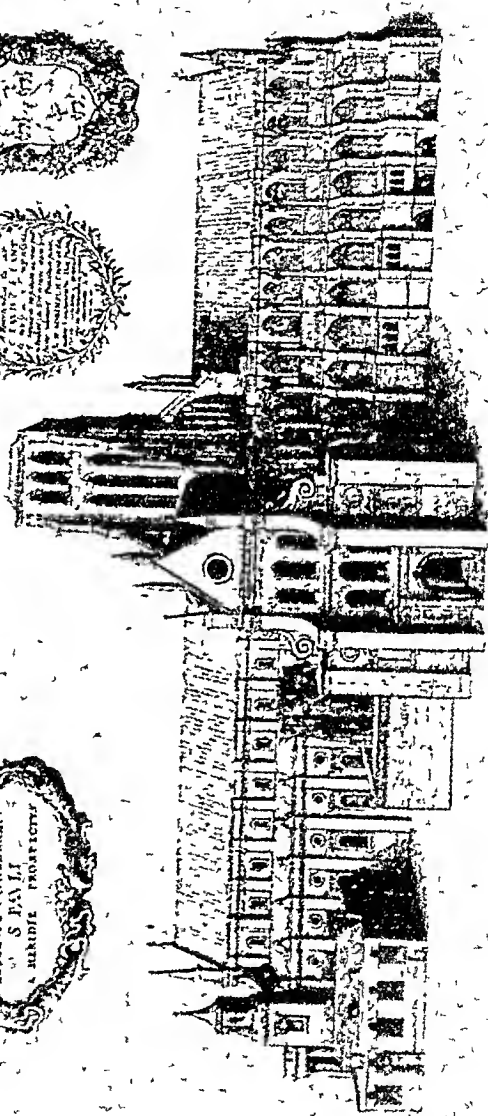
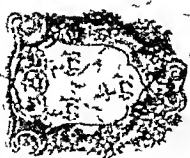


Peruvian Pottery Demon Head Vase.

when the first Inca (or ruler), Sinchi Rocca, lived. By 1400 the whole of the W. coast had been added to their kingdom. Their religion was sun-worship (the mythical Manco had been a child of the sun), but they had difficulty in enforcing sun-worship among the conquered coastal tribes. Their architecture was in stone, the most famous example being the Coricancha (temple to the Sun) at Cuzco. They were notable workers in metal, especially in gold, silver, and copper; huge treasures of gold and silver were plundered by the early Spanish invaders under Pizarro, 1533, from whom Inca civilisation received the



THE RT HON DAVID LLOYD GEORGE, O.M. P.C. M.P.



LONDON "OLD ST. PAUL'S"

first of the blows that led to its decay
See also PERU

Incarnation term used in Christian theology to express the assumption of a human body by the Second Person of the Trinity. The doctrine an essential part of the traditional Christian creed implies in the orthodox view that Christ combined in His human form the attributes of perfect Godhead and perfect manhood. The conception of an incarnation of the divinity is also found in Indian religion especially in connection with Vishnu (q.v.).

Incense the perfume from various substances (gums woods dried herbs resins etc.) when burnt a symbol of religious worship. The practice is of great antiquity. Frankincense was used by Moses for the exclusive service of the tabernacle (Exod. xxx. 34ff) whilst to-day incense is used in Roman and Anglo-Catholic and Greek Churches. Its use in the Church of England was prohibited by the Lincoln Judgment in 1840 but without effect. *See also* THURIBLE.

Incest carnal knowledge between closely related persons. In England it is a misdemeanour punishable with 7 years' penal servitude for any male to have carnal knowledge of his grand daughter daughter sister or mother or for these to permit such intercourse.

Inchcape Sir James Lyle Mackay 1st Earl of (185--193). British shipowner. was born in Scotland and went to India in 1874 where he was a member of the Legislative Council from 1891 to 1898. He was Sheriff of Calcutta in 189 and a member of the Council of India 1897-1911. At various times he has been President of the Shipping Federation. He was made a Baron in 1911 Viscount in 1924 and Earl in 1929. For some years he was chairman of the P. and O. line.

Inchcape (or Bell Rock) dangerous rock situated in the North Sea 11 m. S.E. of Arbroath upon which an abbot is said to have placed a warning bell. This was maliciously cut adrift by a Dutch rover whose ship subsequently

struck the same reef and sank with all hands on board. Southey has based a well known ballad on this story. The existing lighthouse cost £60,000 and was first lit on Feb. 1 1811.

Income Tax, *see* TAXATION.

Incubators, chambers within which a constant temperature is maintained by an automatic device. Incubators are used in all biological work especially for the cultivation of bacteria and microscopic fungi for study of diseases of animals and plants also for the artificial hatching of chicks. Prematurely born children have been kept alive in specially constructed incubators till they were strong enough to endure the ordinary changes of temperature and moisture content of the air of a room.

Indanthrene a compound which is itself a dye and is the parent substance of a large number of dyestuffs. It belongs to the anthracene dyes and is manufactured by fusing together β -amino anthraquinone with caustic potash. It dyes blue and with its derivatives belongs to the class known as vat dyes. *See also* DYES DYEING.

Indemnity in modern times the term has come to mean a contract by which an individual corporation or State agrees to indemnify a person against liability or damage resulting from an act on the part of that person or from loss to that person. In the latter sense a fire insurance policy would be an indemnity. Acts of Indemnity are common in the history of British legislation. One of the earliest was that passed at the Restoration granting pardon to those who had taken part in the rebellion against Charles I. excepting only those immediately concerned in the death of the King. Until 1868 there was in force in Great Britain an Act of Indemnity which was passed at every session relieving from the consequences of their omission all office holders who had not taken a qualifying oath. Frequently too Indemnity Acts have been passed to relieve military commanders from

personal responsibility for their acts. The term "indemnity" also signifies the payment in money or land imposed on a defeated enemy.

Indenture, see **DEED**

Independence, Declaration of (July 4, 1776), a manifesto issued by the 13 united colonies of N America, declaring themselves to be free and independent States. Acknowledged by France, 1778, by Holland, 1782, by England, Dec 5, 1782.

Independent Labour Party, see **LABOUR PARTY**

Index Librorum Prohibitorum The list of books considered pernicious by the Roman Church, and prohibited to be read or possessed by her members. It was first prepared by Pope Paul IV in 1557, receiving sanction for publication by the Council of Trent (1545-63). In 1564, Pope Pius V appointed a committee for the express purpose of continuing this catalogue. Permission can be granted to responsible persons to read prohibited writings.

India, a great Asiatic peninsula consisting of a number of separate States, all, excepting small French and Portuguese possessions, directly or indirectly under British rule, protection, or influence. So great is the area, and so diversified the number of people, languages, and cultures, that India presents, both politically and geographically, more the appearance of a continent than a country. It is bounded N by the Himalayas, the Karakorum Range, and the Hindu Kush, which separate it from Tibet and Afghanistan, S by the Indian Ocean with Ceylon, W by the Arabian Sea, Persia and Afghanistan, and E by the Bay of Bengal and Burma. The surface resolves itself into three principal divisions. The great tableland of the Deccan occupies the whole of the S, and is bounded N by several ranges of mountains which stretch across the centre of the country, and include the Vindhya, Satpura, Bhaner, Mahadeo hills, and Maikal ranges. It is bordered on either side by the E and W Ghats respectively, and is intersected by

several important rivers flowing W to E. They include the Cauvery, Penner, Palar, Kistna, and Godavari with their tributaries. On the E is the Carnatic and Coromandel Coast, and on the W is the Malabar Coast. Several important rivers rise in the N. ranges of the Deccan, they are the Nerbudda, Tapti, San, and Mahanadi.

Between these mountains and the Himalayas is a huge and almost continuous plain, made up of the plain of the Indus and that of the Ganges (qqv), separated by the Thar Desert. These great rivers and their chief tributaries water many thousands of sq m, including some of the most fertile country in the world. The



Municipal Building, Karachi

population, especially in the Ganges plain, is very dense. The great mountain ranges which bound these plains on the N, W, and E, are the third of the surface divisions. The heights of Baluchistan and the N.W. frontier province pass through the Hindu Kush to the Himalayas (qv), which stretch in an unbroken mass across the whole of the N of the country, and branch S to form the Pathai, Barail, and other ranges that form the E. boundary. The Indian coastline is fairly regular, though there are sufficient inlets to provide good harbours at Karachi, Bombay, Calcut, Madras, and Calcutta (qqv). Ceylon (qv) is the only important island, and there are no lakes of note. Extremes of climate are experienced, from the snows of the Himalayas to the intense heat of the

plains. In general it is of the monsoon (q v) type. In the Deccan the mountains intercept the rain and parts of the tableland need considerable irrigation. Cherrapunji (q n) has the world's record rainfall.

Flora and Fauna. Vegetation is rich in many parts and forests on the high ground provide valuable timber. Among the many varieties of wood are teak, bamboo, banyan, mango, cedar and orange. Among animals specimens of most Asiatic types are found. Tigers lions in certain districts, leopards, elephants, monkeys, deer and snakes. Many of the rivers are infested by alligators and crocodiles and there are



Cattle are still largely employed as draft animals in India. The scene shows a well in Benares to be loaded with water at a well in Benares.

innumerable varieties of insects and birds.

Agriculture. Before the British occupation this was dependent on the monsoons and their failure meant famine. For many years past great irrigation schemes have been carried out and millions of acres are now safeguarded from drought. The Sukkur and the Sulej are two of the most valuable barrages. The work of the department of agriculture is gradually improving both in quality of seeds used and the methods of cultivation. Rice the largest product is the staple food of millions. Jute, tea, wheat, cotton and coffee are among the principal crops and others are oil seeds, nuts, sugar and rubber. Vegetables and spices are grown for home

consumption. An enormous number of cattle are raised for ploughing and transport and there are many millions of buffaloes, goats and sheep. A system of agricultural banks is aiding the cultivators. Small farming and community farming are the two most usual methods of land tenure. Forestry is of great value and a permanent commission prevents uneconomic deforestation. In all there are about a quarter of a million sq miles of forest land, most of which is protected or reserved.

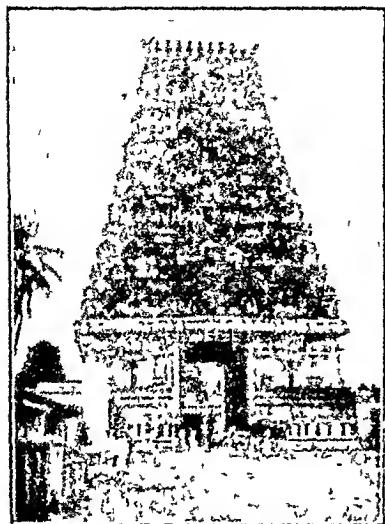
Minerals and Industries. For so vast a country India is not rich in minerals though many varieties are found including coal, petroleum, lead, manganese, gold, salt, silver, mica, zinc and iron. These provide such industries as mining, metal founding, oil refining, engineering and ship building. None is of great importance and industries do not compare in extent or value with agriculture. Cotton and silk spinning are growing in importance. Other industries are rice milling, saw milling, jute pressing and tea. Japanese cotton competition has years ago ruined the once flourishing indigo industry by the discovery of synthetic dyes.

Trade consists mainly of the export of raw materials, the most valuable of which are tea, raw cotton, jute, leather, rice, seeds, wool and wheat. Imports which come mostly from the United Kingdom include cotton goods, machinery, hardware, tobacco, engineering products, soap and chemicals.

Towns. Of the many Indian towns some are the result of European immigration and trade and others have been important cities for centuries. The greatest populations are in Calcutta, Bombay, Madras, Hyderabad, Delhi (the capital) and Lahore. All of these have more than 400,000 inhabitants.

Communications. In addition to the magnificent systems already installed, new railways and roads are being constructed wherever possible. The

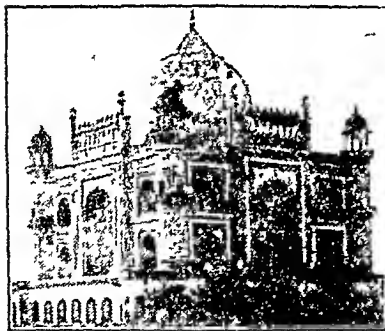
difficulties and the expense are considerable. In 1932 there were c 43,000



Hindu Temple Madras

m of railway Postal, telegraph, and wireless facilities are being increased

Races and Languages India for many centuries has experienced invasion, immigration, and subse-



Safar Jang's Tomb Delhi, a beautiful example of Indian architecture

quent mingling of races, and it is difficult to differentiate sharply be-

tween one people and another, but fundamentally there are usually considered to be 8 types—the aborigines, living in the jungles and hills, the Dravidians who people the S, up to the plain of the Ganges, the Indo-Aryans in Kashmir, the Punjab, and district, the Hindustanis of the Ganges valley, the Seytho-Dravidians, among which the Mahrattas are predominant, the Turco-Iransians W of the Indus, the Mongoloid peoples who have immigrated across the Himalayas and the Bengalis, a



A Native Kashmir Shepherd

fusion of the Dravidians and Mongols. Six separate language groups, apart from English and other European tongues, have been established. About two-thirds of the population speak Indo-European dialects, such as Sindhi, Punjabi, Marathi, Hindustani, Bengali, etc., one-fifth speak Dravidian tongues and the others are Tibeto-Burmese, Munda, Tai-Chinese and associated languages, and Malay.

Religions There are more than three times as many Hindus (239 millions in 1931) as Mohammedans, the next largest religious body, there

are some 1st 800 000 Buddhists and half as many Christians and the other chief bodies are the Jain, Sikhs and Parsis. There are many local and tribal creeds and even Hinduism has variations in different parts of the country.

Education. About one fifteenth of the population is able to read and write and of these the great majority are men. There are 8 principal universities. Calcutta Madras Bombay Punjab Patna Nagpur Andhra and Agra and a number of technical schools.

Political Divisions and Government. India may be generally divided into British ruled and native-ruled States. The former are Ajmer Merwara the Andamans and Nicobars Assam Baluchistan Bengal Behar and Orissa Bombay Presidency Burma (q.v.) Central Provinces and Berar Coorg Delhi Madras N.W. Frontier Province Punjab and the United Provinces. The latter are Baroda Central India Agency Cochin State Gwalior Hyderabad Jammu and Kashmir Mysore Punjab States Agency Rajputana Agency Sikkim Travancore and the W. India States Agency. The total area of the Native States is about one quarter of that under British rule. Government is administered (1) from England through the Secretary of State for India with a council of between 8 and 12 members (2) in India through the Viceroy and two Houses, the Council of State and the Legislative Assembly of which the former has 60 members 33 elected and 27 nominated and the latter 143 members 104 elected and 41 nominated. The Viceroy may with the sanction of the King and the British Government override the Houses in matters concerning public safety.

Provincial government is administered by a governor assisted by a legislative council and a Governor's Council of 4 members nominated by the Crown. The provinces are subdivided into divisions and districts with their local officers responsible to

the Governor. Local self government in domestic matters is gradually being introduced. The Native States are in varying relations with the Crown; they usually control their own domestic affairs but are not allowed to make war form alliances or maintain unduly large military forces.

History. Most of India in early times was settled by dark-skinned Dravidian and pre-Dravidian stocks but Mongolic peoples prevailed in the N. mountain districts. About 2400 B.C. the Aryans began to penetrate the N.W. passes and to spread over the Punjab. Their immigrations continued for nearly 1000 years and by 1500 B.C. they were widely settled in the peninsula. They appear to have differed little from the European members of the race at first living in simple agricultural communities and distinguished by regard for personal liberty. But the caste system of class differentiation probably due to the relation of the conquering race to the conquered arose in early times. The religious teaching of the Buddha (q.v.) was partly inspired by antipathy to the conception of caste but the system had become too deeply rooted to be eradicated and later conquests accentuated this social peculiarity. History can be definitely traced from c. 330 B.C. when Alexander the Great reached the Indus. Greek influence prevailed for a time in N. India. Asoka (?273-231 B.C.) a native prince overthrew Alexander's successors the Seleucids and founded a Hindu empire. A few generations later the Scythian invasions heralded the destructive inroads of the central Asian nomads which disturbed N. India at intervals until the 16th cent. They were followed by the White Huns (5th and 6th cents). As a result of these incursions India gradually fell into utter confusion.

Mohammedan Conquests began towards the end of the 10th cent. From c. A.D. 1000 the Afghan rulers of Ghazni advanced their power until in the 13th cent. they ruled most of N.

India The Mohammedan Mongols threatened India under Genghis Khan in 1219 In 1398 Timur the Tartar sacked Delhi His descendant Babar founded the Mogul (Mongol) Empire after defeating the last Afghan ruler of India at Panipat (1526) Akbar the Great (1556-1605) consolidated the Empire, which included part of modern Afghanistan and India as far S as the Nerbudda The kingdoms of S India, which had hitherto pursued an independent course, came under the Moguls

The Empire flourished under Jahan-gir (1605-1627) and Shah Jahan (1627-1658), but declined under their successors During the 18th cent many local governors became virtually independent The Mahrattas and Pindaris, predatory Hindu clans, were masters of N central India, and terrorised the Deccan In 1738 the Shah of Persia sacked Delhi and occupied the country as far as the Indus The Sikhs, a Hindu sect, gained control of the Punjab By the middle of the century the Empire had become a mere shadow

European Influence Direct European contact was established with India when Vasco da Gama reached Calcut in 1498 Early in the 17th cent the desire to break down the Portuguese monopoly led to the formation of English, Dutch, French, and Danish E India Companies The first clash between the new interests involved the Dutch and English, and led to the Dutch abandoning their schemes in India The settlements of the French and English were limited to a few coastal forts and trading-stations during the 17th cent, but the confusion which followed the decline of the Mogul Empire led to intervention by the European traders in Indian politics The French, centred at Pondicherry, acquired considerable influence in central India, and when the Anglo-French wars of the mid-18th cent extended to the E the French were at first successful The stand of Clive (qv) at Arcot, and the subsequent

campaigns of Eyre Coote, baffled them, and in 1760 they were totally defeated at Wandiwash Britain was then without a European rival in India

British Supremacy After Clive's victory over native forces at Plassey (1757) British influence became supreme in Bengal Warren Hastings (qv), the first Governor-General, repulsed Hyder Ali's invasion of the Carnatic (1780), checked the French fleet in the Indian Ocean, and effected far-reaching administrative and fiscal reforms At the end of his tenure of office (1785) the basis of the British Empire in India was firmly established Lord Cornwallis (1786-93) and the Marquess of Wellesley (1798-1805) undertook operations which broke the power of Tippoo Sahib (the son of Hyder Ali), the independent princes of central India, and the Mahrattas Cornwallis continued Hastings's administrative reforms, and Wellesley initiated the system of subsidiary alliances with native States The Marquis of Hastings (1813-23) conquered the Mahrattas and the Pindaris (1818) and defeated the Nepalese (1816) Under Lord William Bentinck (1828-36) the British Government began to turn serious attention to the social improvement of the subject population Educational facilities were extended, and the custom of *suttee* (widow burning) prohibited, 1829 The renewals of the Company's Charter in 1813 and 1833 had ended its commercial monopolies, and henceforth it existed chiefly as a territorial power of a nature almost unique in history

Alarm at Russian advances in Central Asia and Persia was responsible for Britain's disastrous Afghan War (1838-42), but the British power continued to grow Sind was annexed (1843) and the Punjab in 1849 Part of Burma had been absorbed in 1826 Under the government of Lord Dalhousie (1848-56), railways were built and internal communications improved Oudh and the Central Provinces were acquired, 1856 Then in 1857

came the Indian Mutiny (q.v.) This led to the supersession of the Company by the direct administration of the Crown (1858).

Under Crown Government wars have been mainly confined to defence of the frontiers such as the second Afghan War (1878-80) and the numerous petty campaigns on the N.W. Frontier. The principal exception was the Third Burmese War (1885-6) which led to the annexation of Upper Burma and the Shan States. In 1877 Queen Victoria had become Empress of India. The Marquess of Lansdowne (1888-



The Great Mosq. Seripatan built by Sultan T'poo Bahadur

94) began the reform of the currency and Lord Curzon (1899-1905) was indefatigable in the preparation of far-reaching schemes of social and economic betterment. In 1912 the capital was moved from Calcutta to Delhi.

Although Indians had been associated with the administration since Bentinck's day the feeling that they were entitled to a larger share in it had been growing and in Bengal during 1907-8 the movement assumed a revolutionary aspect. The Minto-Minto reforms were then designed to satisfy legitimate native aspirations

The rulers of the native States displayed great loyalty during the World War and recruited for the British Armies. Radical ideas were however extending with the spread of Western ideals and education and the influence of Indian emigrants returning from democratic countries. The Montagu-Chelmsford Report advised extensive administrative reforms and a statute embodied its findings in 1919. Anti-British agitation continued associated with non-co-operation campaigns led by Gandhi (q.v.) and there was serious disorder in the Punjab. In 1921 the rising of the Mohammedan Moplahs was followed by vigorous measures for its suppression and later the Bengal Government received special extraordinary powers to deal with violent crime. The Indian Nationalist Party condemned violence (19) but disturbances persisted during the visits of the Simon Commission (q.v.) in 1928-29.

The Commission's recommendations (published 1930) foreshadowed a revision of the Constitution in the direction of federalism but they met with vehement disapprobation in India and violence broke out again. A Round Table Conference met in London in the same year to discuss the proposed revision of the Constitution but the representatives failed to reach agreement. The British Government then appointed various committees to report on the more vexed questions and meanwhile strict measures were instituted to cope with the disorders in India (193). The Government published a tentative outline of a scheme for dealing with the situation which is now (1933) being considered by a parliamentary committee and warmly discussed by leaders of various opinions.

CONSULT *Statistical Abstract for India* (annual). *Report of the Indian Statutory Commission* (Simon Commission). *The Cambridge History of India*. Sir T. W. Holderness *Peoples and Problems of India*.

Indiana, State of E. central U.S.A.

situated N of the Ohio R between Illinois and Ohio, and bounded N by Lake Michigan and the State of Michigan. The surface of the State is a plain watered by the navigable Ohio and Wabash Rs. It is important agriculturally and industrially. There is a large field of bituminous coal, and iron and steel manufactures are extensively carried on. Wheat is the chief cereal, others are oats and rye. The hay crop is considerable. The lumber (hardwood) market of Evansville on the Ohio R is the largest in the country. Inland transport is highly developed, especially by water, and electrification of railways between the towns is more extensive than in any other State. There are 4 large universities. The chief city is Indianapolis (364,000) Area, 36,354 sq m, pop (1930) 3,238,503.

Indianapolis, capital of the State of Indiana, USA. Planned after a definite model, and divided up into main avenues radiating from a centre, it has become a pattern for the reconstruction of other American cities. Chief industries are its cattle trade, meat packing, agricultural machinery, textiles, and glass. Pop (1931) 364,000.

Indian and Sinhalese Art As many and as widely differing schools and periods can be traced in the art of India as in that of Europe, nevertheless, to European eyes, there is a strong kinship manifest in all of these, differentiating them all quite decisively from most other arts of the world.

Indian art never strives to please the eye, but to assist the beholder—the worshipper in the temple—to attain an ecstasie, if temporary, identity with the divine powers of nature. To understand and appreciate fully the highly complex Indian art it is therefore necessary to be acquainted with Indian mythology and theology, with rituals of worship, of dancing and ceremonial, and with the meanings of symbols and gestures. Nevertheless, in architecture, sculpture, and paint-

ing, there is a vast amount of Indian work whose beauty is immediately recognisable by the European.

The history of Indian art dates to prehistoric times. Ancient cave paintings, like those of France and Spain, represent animals and hunting scenes, and are probably Neolithic or earlier. There is no reason to suppose that any break occurred in the cultural development of the race, but rather that for centuries sculpture and architecture must have been carried out in wood and clay, and consequently have perished. Remains of cities dating from before 3000 B.C. have been discovered, in which pieces of sculpture in marble, alabaster, and terra-cotta have been found, as well as small finely-carved plaques or seals of ivory and pottery, and jewellery of gold and silver. Indian art was, and remained, Dravidian in origin, the Aryan invasion of c. 1500 B.C. leaving little trace on its development, but the presence of the Greeks after Alexander's expedition of 326 B.C. considerably influenced both architecture and sculpture in the N.W. and the Punjab.

The first stone sculptures date from the reign of Chandragupta Maurya (322–297 B.C.) and continue with his descendants through the Maurya period until 184 B.C. These stone carvings are of great massive figures, broadly treated, and endowed with much dignity. The famous Asoka edict pillars with figures of animals carved on their capitals show a highly developed artistic and technical accomplishment. The Sunga and Andhra periods followed, lasting into the 3rd cent. A.D., and producing large numbers of sculptures and reliefs in which appeared first many of the motives and symbols which persisted for centuries. The emblems of Buddhism are combined with those of Shiva and Vishnu, and the other ancient pantheistic deities of Hinduism, and the carvings on the great stupas of Bharhut and Sanchi illustrated many episodes of Buddhist legends. It was not until or after A.D. 100 that the

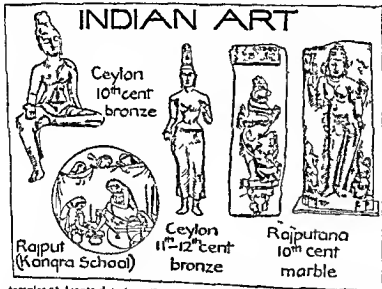
image of Buddha himself appeared standing or seated on a lion throne. Figures of Jinas probably date from much the same time. The Amaravati reliefs and carvings of the end of the 3rd cent. A.D. are among the finest in the whole history of Indian art.

The Gupta period (370-480) brought to India a new unity artistic as well as political. The Buddhas grew less massive and more gracious and refined with close-lying drapery. The wonderful wall paintings of the

and often beautiful in drawing and in colour. Examples of these paintings also of sculpture in stone and bronze can be seen at the British Museum.

Consult J. Fergusson and J. Burgess: *The Cave Temples of India* 1880. E. B. Havell: *Indian Sculpture and Painting* 1918. O. C. Gangoly: *Masterpieces of Rajput Painting* 1927. E. B. Havell: *Handbook of Indian Art* 1910.

Indian Architecture. Early Indian architecture was mostly of wood, the



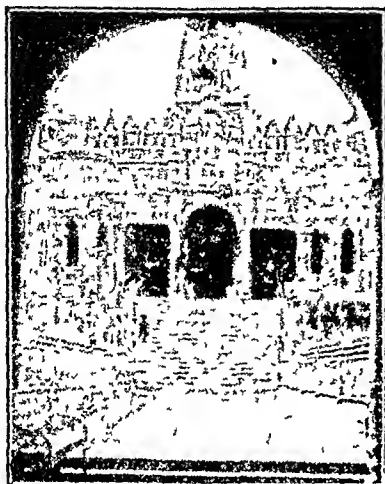
temples at Ajanta date from this time. The Gupta period has been called the golden age of Indian art.

Throughout the period of the Middle Ages numerous schools throughout India continued to produce sculptural and decorative work of great excellence, and in the southern part of the continent at least this process was continued until quite recent times. Various schools of painting and MSS. decoration flourished. Much of the Rajput painting of the 11th and 12th cent. is highly decorative in treatment.

Some forms later emerged in stone, the work of the Dravidian rather than the Aryan race. There are rock hewn caves, temples, monasteries, monuments, shrines, and magnificent palaces occupied by ruling princes.

Of ancient architectural remains in India the cities of Mohenjo Daro and Harappa, built of well burnt brick, provide the best examples. A few temples, houses, and shops, and a good drainage system remain to remind us how well the work was done in that distant age.

At Ellora in the Hyderabad State, a fine series of rock-hewn caves, Brahmin, Buddhist, and Jain in style,



Jain Temple

shaped and carved out of solid rock, show marvellous efforts of sculpture, design, and varied forms of ornamentation

The Kailasa Temple in the Brahman caves is one of the noblest Hindu remains of antiquity in India. An interesting feature is the number of carved figures of varying proportions that guard the entrance to a shrine.

Indian architecture is divided into 3 main styles, Dravidian, Chalukya, and Northern, all rich in ornamentation and detail. At Sanchi, near Bhubaneswar, stands the most imposing and perfect example of Buddhist architecture in India. The Great Stupa, with its vast dome, doorways elaborately carved, varied capitals to structural pillars, some of which bear symbols appropriate to the worship of the Temple, and the columned apex to the dome, provides an architectural feature of interest and wonder. Not far away are miniature votive stupas scarcely a foot high. A peculiarity

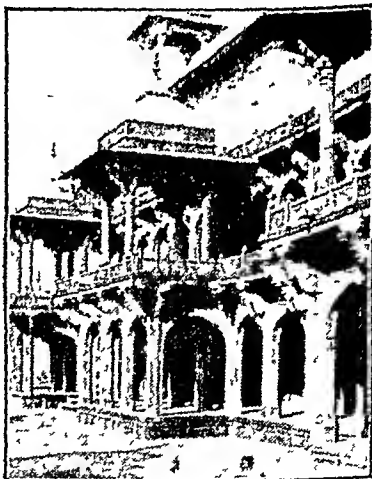
of Buddhist architecture is the use of squat columns.

The Jain style is noted for temple architecture, the chief characteristic being the shrine cell, in which the only light comes from the entrance. Another variation is the large domed building. Jain ornamentation is more delicate than Buddhist.

The Hindu style covers a wide field in N., Central, and S. India. It resembles Jain in certain forms, but makes considerable use of the storied tower in place of the dome.

The Hindu temples at Rameswar and Tanjore in the S. are famous, while at Ittagi (Hyderabad) is perhaps the most notable of the many groups, including work of both the Dravidian and Chalukyan styles.

For examples of Indian Mohammedan architecture the famous Taj Mahal and Akbar's Tomb at Sikandarah are outstanding, the former being one of the wonders of the world. See also



Akbar's Tomb at Sikandarah

ARCHITECTURE CONSPECTUS OF HISTORY

Indian Corn (or Maize), cereal. Seed is sown in drills 2 in. deep and 2

Ganges, Godavari, and Irawadi into the Bay of Bengal. The chief islands of the E basin, Java, Sumatra, etc., are mostly formed by the summits of submerged mountain ranges, and are commonly subject to violent volcanic disturbances. Coral formation, often about volcanic nuclei, is frequent, particularly in the central ocean. The principal islands in the central area, Maldives, Laccadives, Seychelles, Mauritius, etc., appear to crown two or more submarine ridges. The large continental islands are Ceylon and Madagascar.

The oceanic area most frequented by shipping lies mainly within the tropics. The uniform distribution of winds characteristic of the same area in the Atlantic is disturbed in the Indian Ocean by monsoon conditions. The most settled area is from the Tropic of Capricorn to 10° S, where the SE trades persist all the year round. In the N hemisphere the prevailing winds are SW in summer and NE in winter. In the E basin of the S hemisphere the prevailing winds in summer are modified by the NW monsoon. The central ocean and more rarely the Arabian Sea and the Bay of Bengal are subject to violent hurricanes. The chief surface currents of the ocean follow the direction of the prevailing winds.

India Office, the British governmental department concerned with the conduct of Indian affairs. Until 1858 these were administered by the East India Company, and supervised by a Government Board of Control, whose president was responsible to Parliament. In that year these administrative duties were taken over by a Secretary of State and a Council of 8 to 12 members—in 1933, of 10 members, 3 were Indians. In the Administrative Division of the Office there are the following secretariats: Financial, Military, Economic and Overseas, Political and Secret, Public and Judicial, Services and General, together with an Accountant-General and a Super-

intendent of the Records. In the Executive Division there is an Accountant-General's Department, a Military Department, and numerous miscellaneous appointments. The India Office is situated in Whitehall, London.

There is also an office of the High Commissioner for India, who was appointed in 1920 to act as agent for local Indian Governments in the



India Office, London

United Kingdom, and to undertake such duties as should be referred to him by the Secretary of State.

Indicators, chemical substances which, under certain conditions, change colour or give a coloured precipitate so that it is possible by their aid to determine the end-point of the reaction under observation. Indicators are principally used in volumetric analysis (titration), and are usually either weak acids or weak bases.

The commonest indicators are litmus, phenolphthalein, methyl orange and methyl red, the more important of which are described under their own headings. The use of indicators is discussed in the article HYDROGEN-ION CONCENTRATION.

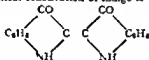
Indicator, Watt's, an apparatus for graphically recording the relationship between the pressure and volume of steam or other working fluid in the cylinder of an engine. In the form given it by Watt, and still used to-day for reciprocating steam-engines, the pressure of the steam in the cylinder

operates a pencil on the end of a lever whereby the motion produced by the pressure is magnified. The pencil writes on a piece of paper wrapped round a vertical drum which is rotated by means of a cord attached to the cross head of the engine so that the cylinder rotates first one way and then back in proportion to the movement of the steam-engine piston. The curve drawn by the pencil on the paper (*indicator diagram*) thus shows the relation between pressure and volume of the steam

ment was endorsed *No True Bill* and the accused discharged. Strictly speaking such an accusation was a *bill* and did not become an indictment until it had been found a true bill. Since the abolition of the grand jury in July 1933 the indictment may be preferred by any individual if certain conditions are fulfilled (*see JURY*).

Indigestion, *see* DYSPEPSIA

Indigo a naturally-occurring blue dye found in the juice of several plants of the genus *Ind.fera* and in woad. It occurs as a glucoside indican which hydrolyses by the action of ferments producing glucose and indoxyl. This latter on oxidation turns into indigo. A small amount of commercial indigo still comes from India although the manufacture of synthetic indigo has almost ruined the trade. The raw material for the manufacture of synthetic indigo is the hydrocarbon *naphthalene* (*q.v.*) which goes through the following stages: Naphthalene \rightarrow phthalic acid \rightarrow anthranilic acid \rightarrow phenyl glycine-o-carboxylic acid \rightarrow indoxyl \rightarrow indoxyl \rightarrow indigo. The chemical constitution of indigo is



Indigo is a dark blue powder insoluble in water. It is a vat dye and is applied by obtaining the water soluble (in alkaline solution) indigo-white which is the reduced form of indigo impregnating the tissues with this and then exposing them to air when oxidation takes place with formation of indigo and the resulting blue colour. *See also* DYES, DYEING.

Indium, a rare metallic element found in small quantities in zinc blende and obtained from commercial zinc. It is a silver white metal softer than lead. Numerous indium compounds have been prepared but at present neither they nor the metal have any practical application. *See also* ELEMENTS.

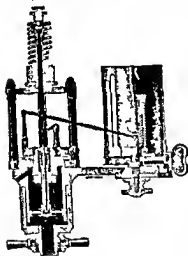


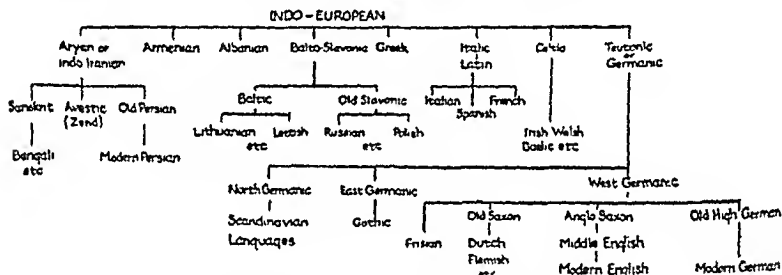
Diagram of Steam Engine Indicator

in the cylinder its area is proportional to the rate at which the engine develops power in the cylinder the indicated horse power as it is called.

Indictment, a written accusation against one or more persons accused of a crime formerly laid before the grand jury which examined the evidence in support of the charge. If at least 12 of the jury thought the charge well founded the indictment was endorsed *True Bill* the accused stood indicted and had to be arraigned at Assizes or Quarter Sessions. If the charge was not sufficiently supported, the indict-

Individual Psychology, a theory of psychology, propounded by Alfred Adler and differing in many respects from the psycho-analytical teaching of Freud whose pupil he was. According to Adler and his adherents, all life's ills emanate from lack of co-operation in the individual's social life, occupation, or marital relations. This is due to a wrong way of living, and it is the purpose of Adler's individual psychology to discover the vocation and conduct best suited for the happiness of each individual person. In the Adlerian technique a great part is played by early memory, which the Adlerians use largely as an indication of the psychological "class" to which the patient belongs, and the treatment to be adopted.

the languages of Western civilisation and many of the languages of India, Persia, etc. The family has also been called *Indo-Germanic*, *Indo-Aryan*, or simply *Aryan*; but none of these terms so well indicates its nature and extent as *Indo-European*. All the languages of this family may be regarded as various dialects which have a common origin in a hypothetical parent speech. Some of them are so remotely related to each other that only a trained philologist can see the connection, others are so similar that no one can fail to observe the fact, but that they are all inter-related is a fact capable of scientific proof. They fall into fairly well defined groups and sub-groups, as shown in the table below.



Genealogical Tree of Indo-European Languages

Individual psychology has been used as a method for dealing with difficult children of school age.

CONSULT. *Problems of Neurosis* (1929), Alfred Adler, *What Life Should Mean* (1931), P. Mainet, *The ABC of Adler* (1928).

Indo-Aryan Languages, see **INDO-EUROPEAN LANGUAGES**.

Indo-China, peninsula of S E Asia terminating in Cape Cambodia, N E of the Malay peninsula, and bordered by the Gulfs of Tonking and Siam and the S China Sea. It comprises French Indo-China and most of Siam (*q v*), the W boundary is roughly determined by the valley of the R Menam.

Indo-European Languages, a linguistic family comprising nearly all

Indole, an organic compound which in the pure state consists of colourless crystals with a melting-point of 52°C . It occurs in coal-tar, in the essential oils of several flowers such as jasmine, and in faeces. It possesses an unpleasant faecal odour, but in small quantities is utilised in perfumery. Indole may be prepared synthetically.

Indonesia, general name for the islands of the Indian Ocean where the inhabitants display certain cultural and linguistic traits in common. Java, the greater part of the Dutch E Indies, the Philippines, and Borneo are included under this definition. The archaeology of the region is of great importance and interest, supplying valuable evidence of the connection

between the civilisations of the old world and Oceania. Indonesian languages have also an important connection with the dialects of the Pacific Islanders.

Indonesian Languages a group of Austronesian Languages (*q t*) the most important of which are I Malippe, Formosan, Malay, Java, Sunda and Dayak. They are distinguished from Melanesian and Polynesian by their very full use of prefixes and infixes.

Indore (1) a protected native State of Central India included in the Central India Agency. It is governed by the Maharaja Holkar and originated as a feudatory of the Mahratta ruler or Ieshwa in the 18th cent. The inhabitants are predominantly Hindu. The principal productions are wheat, cotton and drugs—opium and cotton are manufactured. Area 96,6 sq m. pop (1931) 1 318 200. (2) The capital of the State situated on high ground above the R Saraswati. It is an important market with a considerable cotton industry. The British Resident has his headquarters in the vicinity. Pop (1931) 127 300.

Induction *see* MAGNETISM.

Indulgence, in Roman Catholic theology, a remission of the temporal punishment which is still due to sin after sacramental absolution. In 367, Valentinian instituted the practice of granting on Easter Day a general release to all except the worst offenders. This act of grace continued by the emperors was first termed an indulgence by Pope Alexander II in the 11th cent. The papal system of indulgences originated with Pope Gregory VII in 1077 and the Council of Clermont to promote the Crusades granted plenary indulgence to the Crusaders in 1090. The doctrine of indulgences was made an article of faith by Clement VI in 1343 but the system was abused by the farming out of indulgences. This was severely attacked by Wyclif, Luther and others. A new law regarding indulgences was framed by the Council of Trent in 1546. *See* SUPEREROGATION.

Indus the great river of N W India rises in the glaciers of the Karakoram near the sources of the Brahmaputra and Gogra flowing first N W and W about 400 m. It turns S W into the Punjab whence it crosses the deserts of Sind and enters the Indian Ocean through a silt-encumbered estuary S E of Karachi. The principal tributaries are the Kabul R on the right and the confluent Five Rs of the Punjab on the left. The Indus traverses mainly desert and mountainous country. A few large towns are situated on its banks of which Hyderabad (Sind) is the chief. The irrigation works in Sind dependent on the great Sukkur barrage are of great economic importance. The lower river is well provided with bridges usually of more strategic than commercial importance. The river navigable up to Attock; the principal artery of trade in the N W. Length some 1800 m.

Industrial Court, a Court of Industrial Arbitration created 1919 to which the Minister of Labour can refer with the consent of both parties industrial disputes for settlement.

Industrial Organisation Industry may be defined as the organisation of production for profit. Modern industry is a comparatively new development of social effort having its origin in the changes brought about by the Industrial Revolution (*q v*) at the end of the 18th and the beginning of the 19th cents. The most important of these changes were the introduction of various forms of mechanical power, the development of machinery and the exploiting of the principles of division of labour and its corollary mass production.

Industrial organisation includes many aspects—geographical, technical, human, distributive and financial.

Geographically, industry becomes established in accordance with certain specified tendencies. Where possible it settles near the source of its raw material thus saving the cost of transport. A similar tendency also encourages its establishment close to the source

of power, especially where the fuel is bulky, as in the case of coal. The fuel factor, however, is now being discounted by the growth of electrical power, which, being easily transmissible by wire, makes proximity to the source unnecessary, and is already tending to decentralise industry from its traditional sites.

Access to markets is another important consideration, and in defiance of the first principle has established a large number of industries among the dense population of England (rubber and cotton manufactures, for example) which derive their raw materials from great distances.

The growing use of machines has so far failed to raise agricultural wages, owing to international competition, but low wages are steadily becoming discredited in industry, as it is more widely recognised that mass production cannot succeed unless millions of people have a high purchasing power.

Special climatic conditions may be of some advantage for the establishment of an industry, the damp atmosphere being one of the principal factors in the attraction of the textile industry to Lancashire, and the clear, sunny, rainless weather of California making it eminently suitable for the headquarters of motion-picture production.

The organisation of the factory, plant, or mine has steadily tended towards wider control and larger units since the industrial revolution. The advantages of an increase in the size of each unit are to be found in the possibility of obtaining raw materials cheaper in bulk, of spreading overhead expenses over a larger production, of utilising waste products economically, and of greater ease in marketing.

This tendency has been expressed in three ways: firstly, by an increase in the physical size of each unit; secondly by amalgamation of many units engaged in the same process (horizontal combination); thirdly, by the amalgamation under one control of units engaged in successive processes, from the production of the raw material

to the completion of the finished product (vertical combination).

The importance of a certain market and the disastrous effect of price competition on large modern industrial concerns have also encouraged that form of voluntary agreement between different units in the same industry, known as the cartel, one of the most important examples of which is the Continental Steel Cartel, which allocates production and markets to the steel industries of all important European countries except Great Britain.

The organisation of management and labour varies greatly from industry to industry, some (such as the coal industry) requiring large numbers of manual workers, others (such as printing) very highly skilled labour. Broadly speaking, control is usually passed down from a board of directors to a general manager, thence to departmental managers, to foremen and to workers. Hours and conditions of labour, again, vary with different conditions. Hours of labour have been steadily dropping since the industrial revolution, as increase in machine efficiency makes it possible to produce more goods in less time. Twelve and even 14 hours a day were not uncommon in the early years of the 19th cent., but a 'Ten Hours' Act was passed in 1814, and an International Convention in 1919 demanded an 8-hour day, which in most industries is at present regarded as normal.

In the autumn of 1933 it was announced that Imperial Chemicals were going to try the 40-hour week in their Billingham works.

The most common method of marketing is by the sale of factory products in bulk to a wholesaler, who in turn supplies stores and retail shops. Sometimes the manufacturer canvasses for orders direct among retailers, or even sets up his own retail shops. The modern chain-store system makes possible large-scale buying by the retailer, and facilitates distribution. Most large contracts, especially in the coal and engineering industries, are

gained by tender. Export marketing is usually done through agents in the country concerned, by travelling salesmen and by the organisation of trade fairs and exhibitions at which goods are displayed to foreign buyers.

The normal financial organisation of modern industry is that of the joint stock company in which working capital is publicly subscribed in small shares which represent the limit of responsibility of the shareholder and are awarded proportionately with the profits. These stocks and shares may be bought and sold on the Stock Exchanges of the world and the profitability or otherwise of the concern is reflected in their current price. The holding of the majority of shares in a company carries with it the right of control. This is in contrast with the private financing of business by one man or by two or more partners which was common in the early days of the industrial revolution when the unit of industry was still comparatively small.

Still another important form of financial organisation is represented by the Co-operative Movement (*q.v.*) in which large numbers of retail consumers band together to buy and even to manufacture co-operatively.

Industrial Revolution is the name given to that upheaval in social and economic life which marks the transition from a primarily agricultural to a primarily industrial society.

The chief changes which it brought took place in England at the end of the 18th and the beginning of the 19th cents. In several progressive countries such as Germany and the United States an industrial revolution followed within 50 years of that in Great Britain.

In this country the general introduction of machinery had several important social effects. In the first place it brought about an enormous increase in the output of goods of all kinds which in its turn raised the general standard of living and made possible the

increased population. Secondly it led to an unparalleled growth in the size of towns as centres of manufacturing and in the importance of town life.

In the third place it introduced the principle known as division of labour. Instead of one man making an article from the first process to the last as in the old economy, manufacture now became divided into many small processes each allotted to a separate worker. As the industrial revolution developed this principle of division of labour by extension became applied to different regions and different countries, some specialising in food production, some in raw material products, some in manufacturing, some in commerce. There followed a great increase in international exchange and in the importance of foreign trade.

Technical. The touchstone of the first part of the industrial revolution was the invention and growth of steam power and its application to simple machinery.

In 1735 Abraham Darby had succeeded in smelting iron with coke instead of with the charcoal which had hitherto been used for the purpose. This invention and other subsequent developments in the rolling of iron (1760) cheapened the cost of durable machinery which could resist great strain and great pressures. Wooden machinery rapidly decreased in importance and except where specially suitable vanished almost completely.

James Watt produced by successive inventions between 1765 and 1781 a new type of improved steam-engine with a rotary movement. This was particularly suitable for driving other machinery which in one industry after another replaced hand power.

Coal and iron, the complementary factors upon which almost the whole later structure of the industrial revolution grew up, now assumed an overwhelming importance in the economy of the country. In 1800 Great Britain mined 10 million tons of coal; in 1845 when the first stage of the revolution was accomplished 35 million. In

1796 she smelted 125,000 tons of pig-iron, in 1839, 1½ million tons

Meanwhile, the development of these basic (heavy) industries served increasingly in the large-scale production of finished goods. The first industry to be so influenced was the textile, which the suitable damp climate and abundant water-power had attracted to the Pennine slopes. Stimulated by a succession of mechanical inventions, cotton piece-goods rapidly became, and for long remained, the principal article of British export, reaching normally 25 per cent of its total value.

By 1820 iron machinery was replacing wooden machinery in all fields, and several new inventions, notably that of Nasmyth's steam-hammer in 1838, increased the accuracy of its manufacture. Iron, however, proved too brittle and too little durable until, in 1856, Bessemer invented a process of carbonising iron into steel cheaply. An enormous increase in machine efficiency, power, and durability became possible with this new material. Other technical and chemical discoveries further improved steel manufacture and sowed the seeds of a new chemical industry.

As we have seen, the industrial revolution depended for its successes upon an increasing exchange of commodities between one part of the country and another, and between different countries.

England was fortunate in possessing a long coast-line with many harbours, and in being at no point far from the sea. Roads had become steadily worse through the 17th cent., and it was natural that new traffic in heavy goods should be diverted to those extensions of familiar sea routes, the canals. A system of canals (*qv*) had been begun in the 17th cent., mainly to carry the increased agricultural production, and still further extended in the 18th. For 70 years canals remained the chief means of transport for the coal, iron, machinery, and other products of the industrial revolution. Roads, which were greatly improved by the turnpike system at

the end of the 18th century, carried only passengers and a few luxury goods of minor importance.

Canal-traffic, though cheap, remained very slow, and as the tempo of life in the new manufacturing towns grew faster, this form of transport lagged behind the needs of production. It was inevitable that steam-power should be adapted to communication; and in 1811 George Stephenson built a practical steam locomotive. The first passenger-line was opened between Stockton and Darlington in 1825, and a line from Manchester to Liverpool, using steam-power exclusively, followed in 1830. The success of these processes caused a railway construction boom in the thirties and forties, and by 1848 there were 5000 m of line in Great Britain, a figure which had been doubled by 1860.

An efficient railway network ensured cheap rapid interchange of goods within the country, and still further increased the importance of commercial centres. It was followed by a similar advance in overseas transport to serve the rapidly expanding export trade.

The later technical development of the industrial revolution consisted mainly in the perfection of principles already embarked upon or envisaged. The ever-increasing flexibility and complexity of the machine reduced the importance of acquired skill on the part of the workman, and subdivided every manufacture into many score of minor processes. Specialisation steadily increased production, whilst scientific research applied itself to reduction of manufacturing costs, utilisation of by-products, standardisation, increased efficiency, and a general lubrication of the industrial machine.

The discovery of two forms of power alternative to steam, gas and petrol must be mentioned. By their means light engines could be applied to road transport, and in the 'nineties, the first modern motor-car was evolved.

Internal-combustion engines were also applied to aviation, while heavy oil Diesel engines were used for shipping.

long hours in their own homes or in the fields for long hours in the factories where their whole lives were regulated by their employers. Early on they began to band themselves together for protection against long hours, bad conditions, and low wages, but this tendency was frowned upon by a *laissez-faire* Government, and the Combination Act was passed in 1799, with the penalty of deportation for such action. When this was repealed in 1824, however, associations of workers sprang up rapidly and trade unions became an integral part of the industrial system, though they did not receive recognition till 1867, and suffered under great disabilities till the end of the century.

The industrial revolution, then, has brought certain advantages and certain disadvantages to the worker. He has achieved through it a much higher standard of living and a claim over an infinitely greater variety of goods than he had before. He has (in the later stages of the revolution) greater leisure and a large number of new recreations to fill it. He has greater opportunities of education, and a better chance of rising from his position. On the other hand, his work tends to be monotonous and dispiriting, and it is difficult for him to have any pride in the finished product towards which he only contributes one process. He is liable to lose his employment through waves of industrial depression over which he has no control and to be displaced without warning by new machinery.

The later phases of the industrial revolution are occupied with economic adjustments calculated to solve or ameliorate these problems.

Industrial Workers of the World, a revolutionary organisation founded in Chicago, 1905, with a view to organising all workers into one union, with subdivisions for each industry, as opposed to the old type of craft unions. It is always been a vigorous body with a rather anarchistic outlook, sabotage playing a large part in its tactics.

Inert Gases, the elements helium, neon, argon, krypton, xenon, and radon, which belong to group 0 of the periodic system, and do not form any compounds. They are also sometimes known as the rare gases. Each is dealt with under its own heading.

Inertia, see DYNAMICS.

Infallibility, see PAPACY, ROMAN CATHOLIC CHURCH.

Infant, a person under the age at which by law he acquires full legal capacity, this age varies in different countries, *e.g.* in Hungary it is 25, in England 21. In England an infant has no political rights and powers; thus, he cannot vote in a parliamentary election or sit in Parliament. An infant may, however, be King or Queen, though a regent would be appointed where a sovereign is under 18. An infant cannot sit on a jury, though he may be sworn as a witness in legal proceedings provided that, in the opinion of the court, he understands the nature of an oath, or may even give evidence unsworn if he understands the duty of speaking the truth, but no person may be convicted on the uncorroborated evidence of an unsworn child. An infant cannot be sued except under the protection of a person called his guardian *ad litem*, appointed for the particular action, generally his father or guardian. He cannot sue except through his "next friend," usually a friend or parent, but an infant may sue in the county court for his wages, not exceeding £100, as if he were an adult. An infant cannot marry except with the consent of his parent or guardian: the age of capacity is 16 for both sexes. An infant can own personal property, but not a legal estate in land, which must be held in trust for him, hence he cannot alienate any legal interest in land but he can, subject to certain restrictions, alienate an equitable interest in land, or an interest in pure personality. Unless he is a soldier or sailor, he cannot make a will (*q.v.*). Contracts (*q.v.*) made by him are either void against him, or voidable by him during

minority or within a reasonable time after attaining majority but he can make a valid contract which is clearly for his benefit and he must pay for necessities supplied to him. He is fully responsible for torts but where one of the elements of a tort (*q.v.*) is a guilty state of mind its existence may be negatived by his youth and he cannot be made liable for a tort so closely connected with an unenforceable contract that such a course would be tantamount to enforcing the contract. Infants over the age of 14 are fully responsible for their crimes but if under 18 their punishment is different from that of adults, correction and the elimination of bad influences being chiefly aimed at. *See also* ADOPTION BASTARD CRIMINAL LAW

Infant Mortality *see* CHILD

Infant Schools establishments for the education of children between the ages of 5 and 8 or 9. They may be a special department of an ordinary school or a separate institution and were founded by Robert Owen in England and by Oberlin on the Continent. *See also* EDUCATION NURSERY SCHOOLS

Infantry term comprising foot soldiers generally. In modern armies the infantry are the spear head of attack and the mainstay of defence (*see* TACTICS). The ancient Greeks depended on their heavy armed foot soldiers assisted by light armed troops whose chief advantage was mobility. The distinction between heavy and light infantry has survived to the present day in the names of some regiments *e.g.* Highland Light Infantry though there is now no appreciable difference in armament and equipment. The Spartans invented and the Macedonians perfected the phalanx more useful in defence than attack. The Roman legionary was the classical example of the perfectly trained foot soldier.

In the early Middle Ages infantry became subordinate to the feudal cavalry and the champion known to Homer reappears but the English archers at Crécy revealed its true

importance and the victories in 1476-7 of the Swiss infantry against the Burgundian chivalry confirmed it. It is only possible here merely to mention Cromwell's New Model army and the innovations of Frederick the Great and Napoleon. Since the 19th cent the supremacy of infantry has not seriously been disputed.

The invention of firearms has increased the range but not changed the importance of the foot soldier. From the earlier times he has been armed with a missile weapon (cross bow musket rifle grenade etc.) and with a weapon for use at close quarters (spear sword pike bayonet etc.). The introduction (*c.* 1700) of the bayonet made it possible for the two to be combined.

The tactical unit of infantry in the British army is the *company* of *c.* 250 men commanded by a major or captain. It is divided into four *platoons* each under a subaltern. Four companies make a *battalion* under a lieutenant colonel and four battalions one infantry *brigade* commanded by a colonel holding the temporary appointment of brigadier. Three infantry brigades are included in an infantry *division* under a major general. Since the World War the mechanisation of the foot soldier and the cavalry man has begun and it has been suggested that in the next European war invasion may be entirely on wheels, infantry moving in armed vehicles and cavalry represented by a host of swift machine-gun motor machines. Experiments in mechanisation have been made in the British Army manoeuvres. *See also* ARMY

Infectious Diseases diseases which are known to be communicable from person to person.

The cause of most of these diseases has definitely been found to lie in the invasion and multiplication in the body of germs usually visible under the microscope. In some of the diseases however the germ has not been identified and it is now believed that in certain cases it is so small in size as to be quite invisible under the highest

powers of the microscope. When the germ is of these dimensions, it is called a *virus* (*qv*).

The way in which the germ spreads varies considerably. Sometimes it is by direct contact between the two people, in spray from the nose and mouth, in scales from the peeling skin, and in the excreta. At other times, the germ spreads by indirect contact, which includes carriage on objects such as books, etc., or by flies and other insects.

In dealing with persons suffering from an infectious disease, the risk of their infecting other people can be much diminished if precautions are taken. First and foremost, the patient must be isolated. All articles used by the patient must be disinfected. The excreta must be very carefully disposed of. The sick-room must be kept clear of insects. Lastly, when the patient has recovered, he himself, together with all his clothing, must be thoroughly disinfected, and the sick-room must be fumigated and thoroughly scrubbed out.

When the disease incidence of a population is looked at as a whole, some very interesting facts come to light. For instance, some infections appear to be latent in a population over a period of months or years, and then suddenly large numbers of the population become ill at about the same time. This is known as an epidemic. From the study of disease statistics, it has been found that most epidemics recur at definite intervals, and epidemics can now be predicted with an almost uncanny degree of certainty.

Sometimes, a disease, such as influenza, will sweep over the whole world; it is then called pandemic.

When a disease is present among members of a population, at all times, to a greater or lesser degree, it is called endemic, but when only a few cases occur at irregular intervals it is called sporadic.

Most infectious diseases have been made compulsorily notifiable. A list of these is here given, but it must

be remembered that a disease cannot be notified until it has been diagnosed. Since many of the infectious diseases are accompanied sooner or later by the appearance of a rash, we have here one method of recognising them, and of distinguishing between them. For in each disease the rash appears after a definite number of days from the onset of the illness (see TABLE). The onset of the illness is taken as the day on which the first symptom appears; this first symptom is usually a rise in temperature, i.e. fever. It must be remembered, however, that the first symptom of fever does not appear immediately after infection has taken place. When the germs have entered the body, there is a delay of some days, or even some weeks, which is known as the incubation period, before the patient becomes ill. Thus incubation time is nearly constant for each particular disease, and upon it depends the length of quarantine necessary.

	Incubation time (days)	Day on which rash appears
Chicken pox	About 16	1st
Scarlet fever	About 3	2nd
Smallpox	About 12	3rd
Measles	About 10	4th
German Measles	About 14	1st-4th
Typhus	About 12	6th
Typhoid	About 11	2nd week
Diphtheria	About 6	None
Anthrax	About 3	1st
Erysipelas	About 4	2nd
Tuberculosis	Several weeks	
Pneumonia	Not known	
Spotted fever	Not known	

All the above are notifiable diseases, with the exception of measles and German measles, and also chicken-pox, though during outbreaks of smallpox chicken-pox is also liable to be made notifiable.

Inferiority Complex, a term in psychology applied to a condition in which the assertive behaviour of certain people is explained as due to a desire to compensate for an imagined or real weakness, defect, or inferiority. It may show itself in various ways, as when a sufferer takes refuge in illness, and is so enabled to tyrannise over his

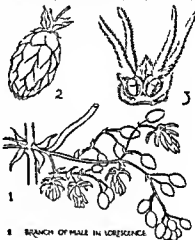
immediate circle. It is claimed that the inferiority complex is often an incentive to individual advance and progress. The classical example adduced is the case of Demosthenes the stammerer who developed into Demosthenes the orator.

Inflation (econ.) an increase in the amount of money in circulation. The term is also widely used to cover an increase in the amount of credit. It may arise from several causes. The most obvious is that exemplified by Germany after the World War where notes were turned out by the printing presses of the Government so fast that the quantity of money in circulation rose by leaps and bound multiplying ever faster and faster while prices rose higher and higher and the money became more and more worthless. Similar though much less violent inflation took place in a number of countries after the War. The currency had no gold backing and was manufactured without any relation to the amount of gold reserves (see GOLD STANDARD).

Quite a different type of inflation took place in the United States in the years 1929-33. Here there was no appreciable increase in the amount of actual money in circulation which was backed by gold and convertible into gold. In the United States there was a vast increase in bank credit. Though this did not have the effect of raising prices of commodities to dizzy heights it did affect the prices of stocks and shares, bonds and real estate. Prices of these did not multiply as prices of commodities did in Germany because the worth of and confidence in the currency did not go down as the quantity of credit went up but it did cause a stupendous boom in common stocks and real estate.

Inflorescence (bot.) the pattern or arrangement of flowers in a plant. The simplest is the single terminal flower such as the tulip. When the flowers are attached without stalks to a common axis as in the

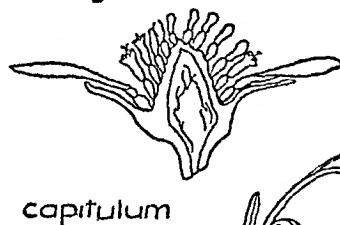
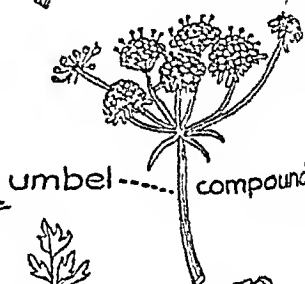
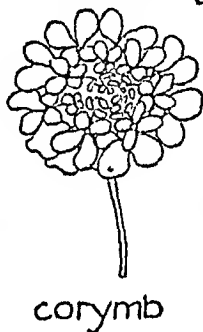
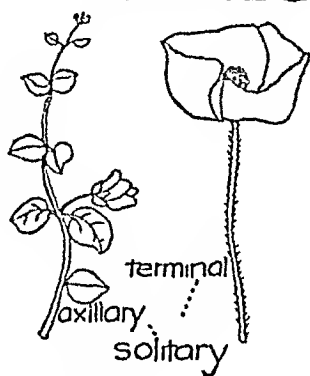
plantain the inflorescence is a *spike* if each flower has a short stalk as in the bluebell and foxglove it is a *raceme* which by branching becomes a *panicle*. When the lower flowers have longer stalks than the upper so that all are brought to the same level and form a flat head the inflorescence is a *corymb* as in candytuft if a number of short stalks of equal length radiate from the end of the flower stalk the structure is an *umbel* seen in parsley or hemlock. A similar structure in which the top of the



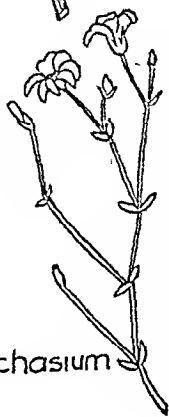
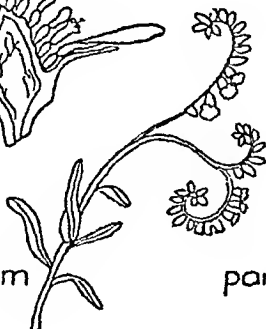
1 BRANCH OF MALE INFLORESCENCE
2 INFLORESCENCE
3 TWO FEMALE FLOWERS WITH BRACTS

flower stalk is enlarged to form a receptacle on which a number of stalkless flowers are set is called a *capitulum* and is exemplified by the daisy. A *cyme* is a flowering stem which ends in a flower but whose growth is carried on by side branches arising a little below the terminal flower as in the elder. A *cathin* (willow or hazel) is a spike of flowers of one sex which falls off entire becoming detached from an articulation with the stem. A spike which becomes succulent and bears numerous flowers surrounded by a sheathing bract is

INFLORESCENCES

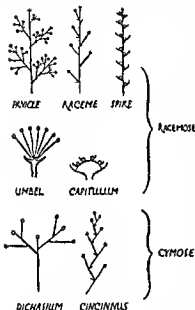


monochasium



called a *spadix* (*Arum maculatum*, lords and ladies). A spike bearing female flowers only and covered with scales is either a *strobilus* as in the hop or a cone as in the fir. In grasses there are usually numerous sessile flowers arranged in small *spikelets* and these clusters are either set closely along a

RACEMOSE & CYMOSE INFLORESCENCES



central axis or produced on a branched panicle

Influenza also called La Grippe and Epidemic Catarrh is an infectious disorder generally occurring as an epidemic. It is characterised by sudden invasion, rapid extensive spread and quick decline. It was first recognised in the 18th cent. and there have been many widespread epidemics several of which seem to have originated in Asia and spread through Europe to America. The epidemic of 1918 was one of the most serious on

record and was prevalent over Europe, the USA, India and Australia. During the worst period of this epidemic over 2000 people died in London in a single week. Influenza attacks people irrespective of their age or conditions of life but the mortality rate in relation to the number of cases is low. It occurs in all sorts of climates and even in ships which are isolated from any land. Since 1897 it has been considered as due to a micro-organism *Bacillus influenza* though the reasons for the occurrence of epidemics is not yet clear. The incubation period varies from 1 to 4 days but is usually less than 2. The disease may effect almost any organ of the body and generally begins with an attack of fever, shivering, headache and general aching throughout the body followed by a sore throat. Mental depression, exhaustion and constipation generally accompany these symptoms which last rather less than a week as a rule and leave the patient in a state where fatigue is easily induced.

These general symptoms are accompanied by three other distinct types specific to the infection—respiratory, nervous and digestive or gastric. The respiratory kind is the commonest. It is accompanied by running at the nose and the temperature may rise to 103° F. The chief danger is the onset of pneumonia to which the high mortality of influenza is largely due. The nervous form is often accompanied by severe backache and headache, neuralgia, sleeplessness and sometimes disturbance of the heart's action. When delirium is present it may pass into mania or the extreme depression often induced may leave permanent melancholia. Sometimes the poison set up by the disease affects the brain in such a way as to produce coma and death. When the digestive system is the primary seat of infection vomiting, colic and diarrhoea set in and the weakness induced in the digestive organs may last for some months.

Most cases of influenza, whatever the type, terminate favourably in a short time. The disease, however, must not be treated lightly. Sometimes vigorous people can struggle on with their normal occupations, but this is a false policy and most unwise. Medical advice should be sought at the outset.

Information, see PRACTICE AND PROCEDURE

Infra-red Rays. The nature of these rays is sufficiently described in **LIGHT, SPECTRUM, ELECTRO-MAGNETIC RADIATION, PHOTOGRAPHY**. The rays are given out by bodies at ordinary temperatures, as we heat a body to higher and higher temperatures, it emits infra-red rays of shorter and shorter wave-length, until at $c\ 500^{\circ}\text{C}$ the waves emitted are short enough just to be visible as red light. We are all familiar with the fact that a stove not red-hot may radiate heat strongly, apart from heating the air by direct contact. Infra-red rays penetrate quite deeply into the body before they are absorbed, and hence infra-red radiation not hot enough to burn may be introducing more warmth into the body than radiation from brightly glowing sources, which is absorbed into the skin and therefore produces painful sensations of heat. Infra-red



Dean Inge

ford College, Oxford, 1889-1904, and select preacher at Oxford and

radiation is used in modern medicine and photography.

Inge, William Ralph (b 1860), English divine and Dean of St Paul's Cathedral, 1911-33. He was assistant master at Eton 1884-8, fellow and tutor of Hert-

Cambridge for many years. His tendency to pessimism as to the future of democratic civilisation has gained him the nickname of "the Gloomy Dean". Amongst his literary works may be mentioned *Christian Mysticism* (1889), *The Philosophy of Plotinus* (1918), and *Christian Ethics and Modern Problems* (1930).

Ingelow, Jean (1820-1897), English authoress, is renowned for one superb poem, *High Tide on the Coast of Lincolnshire*.

Ingoldsby, Thomas, see BARHAM, R. H. D.

Ingram, Arthur Foley Winnington (b 1858), Bishop of London. From



Bishop Winnington Ingram

1881-4 he acted as private tutor, after which (1884-5) he was curate at St Mary's, Shrewsbury, later becoming Private Chaplain to the Bishop of Lichfield, which appointment he held until 1889. In 1895 he was appointed Rector of Bethnal Green; in 1896, Rural Dean of Spitalfields; and Canon of St Paul's Cathedral and Bishop of

Stepney in 1897. Since 1901 he has been Bishop of London. He is a Privy Councillor (1901) and was created a Knight Commander of the Royal Victorian Order in 1915. Author of *The Spirit of Jesus* (1924) and *Holiday Recollections of a World Tour* (1928) etc.

Ingres (AN GR) Jean Auguste (1780-1867) French painter of the classical school was born at Montauban. As a boy he showed great musical talent but after going to live at Toulouse at the age of 12 he began to study painting. In 1796 he went to Paris where he studied under David and won the Grand Prix in 1801. He produced a number of portraits including one of Napoleon before going to Rome in 1806. He revisited that city in 1834 as director of the *École de France* in succession to Vernet. By the time he returned to Paris in 1841 he was generally recognised as one of the leading painters of the day. In 1855 he was made a grand officer of the *Légion d'honneur* and in 1867 the year of his death at the age of 87 the Musée Ingres was opened at Montauban where many of his finest works are still to be seen.

Two of Ingres's best known paintings are *La Grande Odalisque* (1814) and *La Source*. The National Gallery contains 3 of his works including *M. de Norvins* described as a good example of portraiture in which he holds a place with Raphael and Holbein.

Inheritance that property which descends on the death of a person to his successors. See **ISOINTESTATE WILL**.

Initiating Explosives see **EXPLOSIVES**.

Initiative Popular a constitutional provision which enables the citizens of a country to initiate a referendum on legislation proposed by them. A similar provision was originally included in the Constitution of the Irish Free State but was abrogated in 1928. In Switzerland the method of popular initiative may be adopted on the demand of 50,000 enfranchised citizens and their proposal must then be submitted to a referendum only be-

coming law if supported by a majority of voters and a majority of Cantons.

Injector a device for feeding low pressure fluid into a high pressure space. It depends upon the principle (see **HYDRAULICS**) that when the potential pressure energy of a fluid is converted into kinetic energy by allowing it to flow through a tube which narrows down to a jet the jet will exert a suction which may be used to draw another fluid into the flow. When the rapidly moving mixture of fluids then passes into a gradually expanding tube pressure is regained at the cost of energy of motion. Injectors are commonly used to feed steam boilers with water the paradoxical result being that the pressure of the steam is sufficient to force water into the boiler against a pressure equal to its own. The injector air pump is universally used in chemical laboratories; an air pump worked by steam upon the same principle is used to operate the vacuum brake on trains.

Injunction, in England a legal remedy commanding a party to refrain from doing a particular act. Though negative in form it may be positive in effect e.g. an actor threatening to break his contract may be forbidden to appear at any theatre other than the plaintiff's. Sometimes a *mandatory* injunction may be granted ordering a positive act e.g. the pulling down of a wall which obstructs ancient lights. An *interim* injunction is one granted to protect the plaintiff between the time proceedings are instituted and the time the trial is heard. The final order is called a *perpetual* injunction. See also **EQUITY**.

Injurious Falsehood the wrong of maliciously making a false statement respecting any person with the result that other persons are deceived and act upon it in a manner causing loss or discredit to that person. The person injured has a right to an action for damages. See also **FRAUD** **PASSING OFF**.

Ink *Black writing ink* consists of gallate of iron prepared by adding a salt of iron to gallic acid prepared from

galls To make the fluid suitable for writing, logwood or indigo is added.

Chinese ink consists of carbon in an extremely fine state of division kept in suspension by the presence of gum Its preparation was long a secret of the Chinese, and their product in its finest quality is still unequalled

Copying ink owes its colour largely to logwood, but some iron also is added to it Other copying and coloured inks are made with solutions of aniline dyes They all require the addition of gum in order to yield good copies

Sympathetic inks are invisible until developed by some agent One type is of a colourless substance which forms a precipitate with the developer, thus, a solution of galls may be used as the ink, and this may be developed by a weak solution of an iron salt A solution of starch and potassium iodide may be used, this being developed with iodine The detection of such writing, in absence of knowledge of the correct developer, is often possible by photography or examination by ultra-violet light

Printing ink consists of a pigment made into a paste with a thick varnish consisting of linseed oil, soap, and resin Black inks are made with various carbon blacks with the addition of Prussian blue or indigo The art of making coloured inks has been brought to perfection for the purpose of colour printing (see PRINTING) *Marking ink* consists of a solution of silver nitrate in dilute ammonia, the colour is developed by exposure to heat and light

Inkerman, Battle of (Crimean War) (1854) 50,000 Russians under Prince Menzikov unexpectedly attacked the British camp at Inkerman, near Sebastopol They were held in check till the French arrived, when they retreated with great loss (12,000), as against Allied loss of 4400 Known as the "Soldiers' Battle," since, owing to the dense fog at the start, the men fought largely on their own initiative

Inland Revenue, Board of, Government department connected with the Treasury, which deals with the collec-

tion of revenues from taxation, stamp-duties, etc It is administered by a Chairman, his Deputy, and 3 Commissioners

Inlier, geological term for a piece of country composed of older beds and completely surrounded by newer strata

Innocent: the name of 13 popes

INNOCENT III (*Giovanni de Conti*) (c 1160-1216), was a brilliant scholar, a fearless ruler, and a man of action He succeeded Celestine III in 1198, and brought the power of Rome to its highest point He communicated the Kings of France and Spain, and compelled John of England to receive Stephen Langton whom he had nominated as Archbishop of Canterbury

INNOCENT XI (*Benedetto Odescalchi*) (1611-1689), succeeded Clement X in 1676 A zealous reformer, he antagonised the Jesuits by condemning their moral teachings His protests against Louis XIV led to the famous declaration of Gallican liberties

INNOCENT XII (*Antomo Pignatelli*), Pope 1691-1700, introduced many reforms and ended the quarrel which, for half a century, had antagonised France and the Holy See

INNOCENT XIII (*Michelangelo Conti*) (1721-24), came from a family which had produced a number of popes He schemed to re-establish Roman Catholicism in England through James, the Old Pretender He alienated the Jesuits

Inns and Innkeepers The term "inn" covers most hotels, though it should be distinguished from a tavern, which is a mere drinking-house, and from a boarding-house (*qv*) An innkeeper is bound to receive and afford proper accommodation to everyone who offers himself as a guest, unless there is a good reason for not doing so, *e.g.* if he is drunk, or if no room is available The innkeeper must also, if possible, accommodate his guest's horse and luggage, if the latter is of the kind usually admitted by innkeepers He may, however, require tender of the payment. At

common law whether he has been negligent or not he is responsible for any loss or damage to his guest's property unless it resulted from an Act of God or of the King's Enemies or of the guest himself. By the

So a. Extrav. 1. 1. 1.



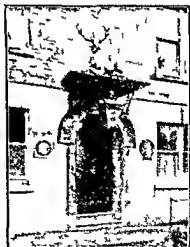
The Living Sign — A live tree outside the door of the inn of which it is the sign. C. 1845. Linc.



1. with a sign in the street.



N. vill. Crest and G. Eridge. Sussex.



Wh. Hart Hotel with doorway from the Priory. Launceston. Cornwall.

Innkeeper's Liability Act 1863 how ever his liability is in certain cases limited to £30 if a copy of Section 1 of the Act printed in plain type is conspicuously exhibited in the hall

third party. Property detained under this right may be sold by auction if after 6 weeks have elapsed and one month before the proposed sale the innkeeper has inserted a notice containing

a description of the property and the name of the owner, if known, in a London and a local newspaper

Inns of Court, law schools situated in London, which have the privilege of admitting members to the English Bar. Their early history is obscure, but the existence of these schools can be traced back to the 13th cent. They were a kind of guild, and nobody was permitted to practise as a barrister unless he had actually served what may be termed an apprenticeship under some barrister or judge, with whom he would live in his private house, thus were developed the inns. Most of these have ceased to exist, such as Staple Inn, Clement's Inn, New Inn, etc. Serjeants' Inn, the most important of those no longer existing, was dissolved in 1877 (*see* SERJEANT-AT-LAW). There remain only Gray's Inn, Lincoln's Inn, and the Inner and Middle Temple. They are voluntary associations, owning valuable property. Each is governed by "masters of the bench," or "benchers," elected from among their own members, whose functions include the calling of students to the Bar, and the taking of disciplinary measures in cases of professional or other serious misconduct. Twenty benchers, five from each inn, form the Council of Legal Education, which supervises legal studies, organises lectures, and holds the examinations. The practice of actual residence at the inn has long since died out, but is commemorated by the "keeping terms," i.e. eating dinners in hall (*see also* LEGAL EDUCATION). Each of the inns owns notable buildings. The Inner Temple stands on the site anciently belonging to the Knights Templars. It shares with the Middle Temple the possession of the *Temple* (*qv*), the beautiful church of the Knights. The hall of the Middle Temple is a superb example of Elizabethan architecture, notable for its oak screen, and windows bearing the arms of former benchers. The meetings of the benchers of these two inns

are called "parliament." The records of Gray's Inn begin in 1569, but it undoubtedly existed as early as the end of the 13th cent. Bacon was its most illustrious member, Elizabeth a patron still honoured in the toasts drunk on "Grand Night." She it was who presented the carved oak screen for the hall, made, it is said, from timbers taken from ships of the Armada. The chapel, small but extremely beautiful, dates from the middle of the 16th cent. Lincoln's Inn is favoured by intending chancery lawyers. Its Old Hall, erected in 1506 on the site of Bishop's Hall, has recently been restored. The New Hall was built in 1843, when the Old Hall proved insufficient to accommodate the ever-growing number of members. Corresponding to the English inns of court, and with the same functions, are the Faculty of Advocates in Edinburgh, and the King's Inn, Dublin. The latter dates from the time of Edward I.

Inoculation, the process by which infective material, usually a micro-organism, is introduced into the system through a small wound in the skin or in a mucous membrane. Blood poisoning and many infectious diseases are caused through accidental inoculation of microbes. The introduction of a virus as a preventive of disease is vaccination, inoculation being performed on animals in experimental work.

Inoculation against smallpox with an emulsion from the crusts from patients was first practised in England in the early 18th cent., but was forbidden by law in 1840.

Inquest, an enquiry by a coroner (*qv*) into a death by unnatural or unknown causes within his district, into a case of treasure-trove, or, in the City of London, into loss or injury by fire. *See also* JURY.

Inquisition, a Roman Catholic tribunal for the investigation and punishment of heresy, first formed in 1210, St Dominic (*qv*) being the first Inquisitor-General. In 1233 Pope

Gregory IX set up in each parish a committee to search out and bring before bishops all those who were adjudged heretics. Such persons were examined and if found guilty were excommunicated and handed over to the civil arm for physical punishment which included torture and death by burning. Sicily received the Inquisition in 1294. Aragon in 1333. Venice in 1249. France in 1377. The Spanish Inquisition a civil tribunal was formed in Castile in 1478. The tribunal was erected in Sept. 1480 and commenced its operations at Seville under the Inquisitor General Torquemada in 1481. It was firmly established in Spain in 1483. Portugal 1536 and Mexico and Peru in 1511. The Inquisition was suppressed in France in 1598. Tuscany and Naples 1784. Spain 1808 but revivals took place until 1808 when the institution was finally abolished. It has been stated that in 936 years 37,000 persons were put to death in Spain and 290,000 subjected to lesser punishments.

Insanity a disease affecting part of the nervous system and producing abnormality of mind but impossible to define precisely since there is no clear line of demarcation between the grades of mental deviation from the normal. Also there exist conditions of mind termed neuroses which medical men do not consider as forms of insanity because their origin can as a rule be traced and a cure effected. Very broadly however a person who cannot take care of his affairs or is dangerous to himself or other people—who is in fact unfit to lead a normal social life—may be considered insane.

The causes of insanity are pre-disposing or exciting both frequently operating together. By far the common predisposing cause is heredity. The inherited abnormality need not be in the form of insanity in each generation. Epilepsy or hysteria (q.v.) drunkenness or even such traits as extreme vanity or intense suspiciousness may be expressions of insanity which appears in its extreme form in

some later generation. Intermarriage between near relations or marriage between two individuals of nervous temperament may predispose towards insanity and another common cause is worry due to overwork too little sleep or business troubles.

The exciting causes are toxic in nature and take the form of poisonous substances which circulate in the blood are carried to the brain and destroy the functions of the nerve cells. Alcohol is the most common of these and produces varied types of insanity. Syphilis may produce insanity long after the original infection with the disease and other diseases like influenza consumption and diabetes may affect the brain. The most curable form of insanity is that associated with childbirth called puerperal insanity.

Disorders of the nervous system are most likely to develop in adolescence in the climacteric period or in old age. Insanity generally comes on gradually and is heralded by various signs the most important being change in disposition either by exaggeration of previous characteristics or by the assumption of entirely different ones. The later symptoms manifest themselves as insane beliefs and actions. These beliefs may be delusions or hallucinations (q.v.).

Mania is a form of insanity characterized by overactivity of the brain leading to garrulousness and in advanced stages to incoherence the person becoming raging mad. A few maniacs die from exhaustion but quite a number recover. Melancholia is characterized by depression and if mild may not necessitate removal to an asylum the person being able to appear normal in the presence of strangers by an effort of will. Recovery is frequent but some cases end in chronic melancholia or in dementia. Dementia varies in degree but when complete the patient is unable to work or to converse at will although the physical health may be unimpaired. General paralysis of the insane is most

frequent in men of middle age and in most cases is due to syphilis. Death usually occurs within 3 years of its onset.

Many cases of insanity can be treated at home, the relatives and friends being responsible for the safety of the patient, and wards are sometimes attached to large general hospitals for the treatment of mild cases of short duration. The asylums for the more serious cases are constructed as far as possible to resemble ordinary dwelling-houses, with different buildings for inmates of each form or stage of illness. Each is controlled by a medical superintendent and staff of doctors, matrons, attendants, and nurses. The line of treatment is by personal influence with kindness and firmness, the patient being allowed some liberty and encouraged to work.

Inscriptions, see EPIGRAPHY

Insect Wax, see CHINESE WAX

Insectivora, an order of placental Mammals (*qv*) of lowly organisation showing points of contact not only with the Marsupials, but with the more highly organised Rodents, Bats, Dermoptera, Primates, and Carnivora. However they never have the gnawing teeth of the Rodents, the wings of the bats, the flight membrane of the Dermoptera, the prehensile hind foot of the Primates, or the characteristic teeth, particularly the front teeth, and cranial features of the Carnivora. The order, containing the smallest of all Mammals, none exceeding a rabbit in size, is found in all the warmer countries of the world, except Australia, though only a few species are found in S. America.

In accordance with their different habitats, the Insectivora, which feed on insects, worms, or other small animals, exhibit considerable variation in structure and appearance, but a long or longish snout is a typical feature. They are divided into a large number of families, of which the best known are the shrews, desmans, moles, hedgehogs, tenrecs, otter shrews, jumping shrews, tree-shrews, and golden moles (*qqv*).

Insects, a class of the Arthropoda (*qv*) distinguished by the division of the segmented body into three distinct parts, head, thorax, and abdomen. In typical insects, the head has a single pair of antennae and three pairs of jaws, the thorax is composed of three segments, each with a pair of legs, and the last two with a pair of wings in addition, the abdomen is typically composed of 11 segments, sometimes fewer, and this region never in mature specimens bears functional walking limbs. Rudimentary limbs are, however, sometimes present on the front segments, and very commonly there is a pair of tail-like limbs, the cerci, on the 11th segment and limbs of one or more of the preceding segments may be present and act as claspers in the male or an ovipositor in the female. Of the other classes of Arthropods the Centipedes, or Chilopoda, seem to be most nearly related to insects, which they resemble in the opening of the generative organs at the hinder end of the body.

Insects in many ways are the most highly organised members of the animal kingdom. They have adapted themselves to almost all conditions of life the world over, have been developed into a great variety of distinct types, and are represented by numbers of distinguishable species, exceeding those of any other class of animals. One or two of the orders have acquired social habits and instincts of an unrivalled type.

By variations in the structure of the jaws, wings, and other parts, and by the extent of the change, or metamorphosis (*qv*), they undergo during development, insects have been divided into a great number of orders which may be assigned to three primary subdivisions.

(1) The *Aptera* or *Apterygota* (*qv*), which are wingless and are believed never to have possessed wings, but have one or more pairs of rudimentary limbs, in addition to the cerci and genital appendages, on the abdomen, and undergo at most very slight

INSECTS



Ailanthus Silk Worm



Stag Beetle



Dragon Fly



Blow fly



Cockroach



Ant



Flea

metamorphosis To this group belong the Bristle-tails (*q v*) or *Thysanura*, of which the silver-fish (*q v*) is a well-known representative, the Spring-tails (*q v*) or *Collembola*, and some very minute obscure insects, called *Protura*, which differ from all other insects by the absence of the antennae.

(2) The *Liopharygota*, in which the wings, when absent, are believed to have been secondarily lost and when present are during growth developed externally on the larva, which is known as the nymph, because it resembles the adult, except for the entire absence in its early stages of wings and mature genital organs, the metamorphosis being slight. The principal orders of this section are the *Orthoptera* (cockroaches, grasshoppers, etc.), the *Dermaptera* (earwigs), the *Plecoptera* (stone-flies), the *Isoptera* (white ants), the *Psocoptera* (book lice), the *Anoplura* (lice), the *Ephemeroptera* (mayflies), the *Odonata* (dragon-flies), and the *Hemiptera* (bugs, green-fly) (*qq v*).

(3) The *Endopterygota*, which resemble the *Ectopterygota* in the possession or absence of wings, but in which these appendages develop internally, and the metamorphosis is complete, the young typically hatching from the egg as a larva unlike the adult and passing into a resting or pupal stage during which the adult characters are developed. To this group belong the *Neuroptera* (lace-wings, ant-lions), *Trichoptera* (caddis flies), *Lepidoptera* (butterflies and moths), *Coloptera* (beetles), *Hymenoptera* (ants, bees, etc.), *Diptera* (flies, gnats), and the *Aphaniptera* (fleas) (*qq v*).

Insolvency, see BANKRUPTCY

Inspiration, a theological term signifying divine influence on the writers of the Bible, thus making their words Divine revelations. It is now generally held by Christians that in the Bible God speaks to man, and that through the action of the Holy Spirit in enlightening, strengthening, and purifying the human vehicle, the Word of God is revealed to mankind. That

Christ acknowledges the inspiration of the Old Testament and the authority of the prophets is clear in Matt. xxiv 45 and Luke xxiv 25, whilst St. Paul declares that "all scripture is given by inspiration of God" (2 Tim. iii 16). Many persons other than those whose books comprise the Bible have claimed inspiration for their writings and sayings, indeed, the guidance of God is recognised by all vital religious movements. Such inspiration may come spontaneously or through meditation. Though Protestantism was largely founded on the doctrine of the verbal inspiration of the Scriptures, its modern mind is towards a wider belief that God's message is to be found in the spirit, rather than the letter, of the Scriptures.

Instinct, see ANIMAL PSYCHOLOGY

Institute of Charity, a Roman Catholic religious Order founded by Antonio Rosmini-Serbatini (1797-1855) (*q v*), and devoted to educational work, the preparation of candidates for the priesthood, etc. It has houses in London, Rugby, and S. Wales. Its members are known as Fathers of Charity, or Rosminians.

Institutionalists, see AESTHETICS

Insulin, a substance, secreted by groups of pancreatic cells, which controls the amount of sugar passing into the blood. In the absence of this secretion *Diabetes mellitus*, a disease due to excess of sugar in the blood, sets in. Insulin was first given as a treatment for diabetes in 1921, it is now prepared from the pancreas of oxen and administered by injection. If given in excess it aggravates the disease. It has lately been identified as a protein akin to egg albumin.

Insurance. The business of indemnifying against loss of goods, money, life, ability to work, etc., in return for the payment of premiums. There are many types of insurance business. Probably the oldest and the most important is marine insurance, which is concerned with ships and their cargoes. Another important branch is fire insurance, and still others are life

insurance employers liability for workmen's compensation fidelity accident motor-car plate-glass insurance burglary insurance loss of profits etc etc

When a group of people are all subject to possible loss each for a considerable amount but all together for a comparatively small proportion of the total that group can insure all its members against loss by collecting in premiums a small sum from each. For instance if 20 people living in a street all pay premiums of a small sum each into a pooled fund if one person has a fire the pooled fund might be sufficient to indemnify the unfortunate person whose house was burned down. Any one of the 20 might have been the unlucky one and would be glad enough to pay into the fund his share in return for the security gained.

The amount of the premiums necessary to meet probable claims is calculated on the basis of experience and the average losses that have occurred in the past. Life insurance premiums are estimated on elaborate statistics of the average length of life and what is called the expectation of life.

Marine Insurance. The insuring of ships and their cargoes was done in Italy and the Hanseatic towns before it became a practice in London but it was in London that the great institution of Lloyd's grew up side by side with a few companies doing business in the same line. Lloyd's was originally a coffee house kept by Edward Lloyd in Tower Street near the Thames where merchants shipowners and wealthy men formed the habit of meeting to gossip or to discuss shipping business and where news of ships was most likely to be found. Ships due to sail to distant ports were known to the men who met here and policies of insurance which were like the old Italian ones in form were underwritten by wealthy merchants and others with capital who knew something of the business and could gauge the risk of a particular voyage and a particular ship. Lloyd's coffee

house was mentioned in the *London Gazette* of Feb 18 1688 and it doubtless existed for a number of years before as a meeting place for persons interested in ships from one point of view or another. In 1690 the coffee house was moved to Lombard Street in the very centre of the business part of London. The system of underwriting marine policies then was essentially the same as it is to-day at Lloyd's. Each policy is passed round to various underwriters each of whom puts down his name for a certain sum. This sum represents the portion of the total insurance which the individual underwriter undertakes to pay in the event of total loss of ship and cargo. Several individuals would take portions of each risk in this way receiving premiums or commissions for their portion in each policy.

The proprietor of the coffee-house realising that prompt news of ships was of the greatest interest to his patrons started the first daily newspaper in the country (except for the official *London Gazette*). This paper gave a list of all ships of which news had been heard and was called *Lloyd's News* which was thus the forerunner of *Lloyd's List* of to-day.

The business of marine insurance however was carried on without rules or organisation until in 1774 a loose association was formed and the history of Lloyd's (as the institution is known to-day) began. A special Act of Parliament passed in 1871 granted to Lloyd's the rights and privileges of a corporation, and set out its three main functions as—(a) marine insurance business (b) protection of members interests and (c) the assembling publication and distribution of information regarding shipping. In 1898 an Act was passed authorising Lloyd's to establish signal stations which are now to be found throughout the world.

Lloyd's may be described to-day as an association of underwriters insurance brokers shipowners and merchants which regulates and facilitates the underwriting of marine insurance.

(and many other types of insurance, but not life insurance) by individual underwriters. Underwriting members are subject to rules as to deposit securities; they must provide guarantees for the liabilities they undertake. A policy is underwritten much as it was in the coffee-house of the 17th cent. An insurance broker compiles a simple statement which shows the name of the ship and its master, the cargo, the voyage, and the value of the total to be insured. He hands this from underwriter to underwriter, each underwriter desiring to do so writes his name and the amount he wishes to undertake as his liability on the ship. When the total value is made up in this way, the policy is drawn up.

Marine insurance is also done by a number of companies, some of which have been in existence almost as long as Lloyd's itself.

Fire Insurance, though now also a part of the business carried on at Lloyd's, was developed by companies, and the great majority of fire insurance written is done by large companies. The business received a great stimulus from the Fire of London. The insurance companies started fire prevention and fire-fighting services before the fire brigade became a department of city government, and the fire-insurance companies even to-day pay an annual sum towards the service in London.

An important feature of English fire insurance is the large foreign business done by the British offices. Fire insurance is written in all parts of the world.

Life-insurance business may be divided into two classes—industrial and ordinary. Industrial insurance is strictly regulated by law to protect the interests of policy-holders. For the most part these policies provide funeral expenses for the person insured and are taken up by poor people who pay very small sums weekly to collectors who call at their doors.

Ordinary life-insurance policies are taken out by wealthier people who pay annual or monthly premiums for

sums to be paid to their dependents when they die, or for endowment which they receive when they reach a specified age.

Accident Insurance is another important branch of insurance business. It includes the liabilities of employers for workmen's compensation, which is one of the most important branches of the business. This particular branch of accident insurance is subject to an agreement between the Home Office and the companies engaged, which fixes a maximum profit. Insurance of their liability under the Workmen's Compensation Act being compulsory, it was thought advisable either that the State should undertake the administration of the insurance as it does in the case of health and unemployment insurance, or that insurance companies should be limited in the amount of profit they should be allowed to make from this business.

Motor-car and Aviation Insurance are two important new branches of business. The latter is done largely at Lloyd's, while the former is undertaken chiefly by companies (see CIVIL AVIATION). Plate-glass insurance is another branch of growing importance.

Another feature of modern insurance business is the Comprehensive Household policy which insures the household against fire, burglary, and number of other risks, including liability for accidents to domestic servants under the Workmen's Compensation Act. See also UNEMPLOYMENT INSURANCE and HEALTH INSURANCE.

Intaglio Printing, see ENGRAVING. PHOTO-ENGRAVING.

Intelligence, the power of quick understanding, of mental readiness, the ability to comprehend a situation. It is differentiated from intellect which is regarded as of a higher order and to comprise the power to think abstractly of matters apart from those of immediate perception. See also ANIMAL PSYCHOLOGY.

Intelligence, Military, the work obtaining and interpreting information concerning the military power and

intentions of other countries both in war and peace-time. An Intelligence Department is in most countries attached to the General Staff of the Army. In peace time it keeps abreast of foreign developments in arms manufacture, military strength, transport systems and air power. It collates statistics published by foreign Governments and also employs its own agents, sometimes directing an espionage system (*q.v.*). In case of war the Intelligence Department supplies the military authorities with maps and all other information concerning the scene of operations. By espionage examination of prisoners and local inhabitants deductions from known information land and air reconnaissance etc. particulars relating to the enemy's strength, position, intentions and reserves can be accurately obtained (*see* ESPIONAGE). Aeroplane and balloon photography has proved a particularly important development of the intelligence service, while aerial reconnaissance is often able to provide up-to-date information obtainable in no other way.

Inter-allied Debts. The total cost of the World War to the Allies estimated at £40,000 millions was met principally by home borrowing (77 per cent). About 14½ per cent was raised by loans from Allied countries: the United States lending £2,150 millions and Great Britain £1,500 millions. Most of these sums were not transferred across any frontier but were merely credits granted for goods supplied. Most of the important debts were funded at various dates between 1913 and 1929 except those of Tsarist Russia which were repudiated by the Soviet Government. Great Britain and France were both lenders and borrowers but only Great Britain and the United States remained at the end of the War with a large credit balance in the various transactions. Britain's credit balance on paper included however the 483 millions due from Russia now regarded generally as a bad debt.

The following are the figures of

funded debts to Great Britain and the USA in millions of pounds and dollars

TO GREAT BRITAIN

	£ millions
Russia (original loan unfunded)	483
France	608
Italy	570
Belgium	119
Yugoslavia	28
Rumania	21
Greece	21
Portugal	21
Other	9

Total (excluding Russian interest) £1,880

TO THE UNITED STATES

	\$ millions
Great Britain	4600
France	4025
Italy	904½
Belgium	418
Russia (original loan unfunded)	192
Poland	179
Czechoslovakia	115
Other	213

Total (excluding Russian interest) \$11,784

These loans were made under three heads—original war loans, reconstruction and relief loans (including those to Austria) and post-war loans for stores and repatriation. Russia was the first country to find itself unable to finance the War and in the first 3 years (1914–17) borrowed nearly £600 millions, a debt which became valueless to the lenders at the revolution. France next began borrowing in London on a gold security, an example followed by the other Allies. On the entry of the United States into the World War in April 1917, Great Britain, France, Italy and the other Allies turned their attention across the Atlantic Congress authorising credits up to \$3,000 millions, a sum later raised to \$10,000 millions.

Soon after the Armistice the British Government allowed its desire for

cancellation of all inter-Allied debts to be known. Such a solution was not agreeable to the U.S.A. In Feb 1922, the exchange of Allied debts to the U.S.A. for securities was authorised, the minimum rate of interest being specified as $4\frac{1}{2}$ per cent. In Aug 1922, Great Britain, faced with a demand for her American debts, sent out the Balfour note to her debtors, in which she expressed her willingness to accept from them a sum equal to her own indebtedness, i.e. only one-quarter of their liabilities. The French thereupon declared their policy of making the payment of Allied debts dependent upon that of reparations. Various proposals for cancellation on both counts were rejected by Mr Bonar Law. In Jan 1923, a British delegation under Mr Baldwin went to the U.S.A. to make a settlement there. The agreement reached allowed for the repayment of \$4600 millions over 62 years in instalments rising from \$23 millions to \$175 millions, interest being borne at the rate of 3 per cent for the first 10 years and thereafter at $3\frac{1}{2}$ per cent.

Mr Baldwin, on returning from America, announced the terms to which he had agreed as soon as he landed and before meeting the Cabinet. Mr Bonar Law thus felt reluctantly compelled to accept a settlement which he regarded as extremely onerous. The first payment was made on June 15, 1923. Various abortive missions by French delegations to Washington on the same business were followed by a successful agreement in 1926, the rate of interest being nil up to 1930, 1 per cent to 1940, 2 per cent to 1950, $2\frac{1}{2}$ per cent to 1958, 3 per cent to 1965, and thereafter $3\frac{1}{2}$ per cent. The Belgian and Italian terms were still better.

Meanwhile, agreements were made by Great Britain with Italy and France in 1926. France was to pay £4 millions in 1926-7, rising by £2 millions annually to £10 millions in 1929-30, then £12,500,000 annually until 1957-8 and thereafter at £14 millions for 21 years—a remission of more

than two-thirds the indebtedness. Italy agreed to pay £4,500,000 annually for 62 years. Other funding settlements followed, the net result of which was that although Great Britain lent more than one and a half times her borrowings, she was committed to pay more than twice what she received. Reparations due completed the balance of her payments.

This situation continued with little change until 1932. In that year the reparations due from Germany to the Allies were, except for a negligible balance, remitted. In spite of the United States belief that reparations and Allied debts were not related, this action radically changed the position. France, Italy, and other debtors of Great Britain, who were now receiving no reparations, demanded remission, which was allowed. Great Britain, left with an annual net deficit of £38 millions due to the United States, made representations in a note to that country in the autumn. The answer was unconciliatory. After a further note, which still obtained no concession, the British Government, whose instalment was due on Dec 15, offered a token payment of £2 millions on condition that negotiations should be reopened at the earliest possible moment. The United States Government accepted the payment, but refused the condition. Several other countries followed the British example by making a token payment, but another group, headed by France, defaulted. New negotiations between Britain and the United States in the autumn of 1933 failed again, and it was arranged that another token payment should be made in December.

Interdict, in ecclesiastical law, a censure debarring a person or persons from the use of certain sacraments and other offices and rites of the Church. It may also be directed against a place—i.e. a particular church, city or country. England was laid under an interdict for a time in the reign of John (1208) by Pope Innocent III.

Interferometer, an instrument

making use of the interference of light (*see* Optics) for various purposes to which its many different forms are specially adapted. The essential principle of these instruments consists in splitting up a beam of light usually into two parts and causing these to take two different paths and then recombining the two in a suitable eye piece. If the two paths are exactly equal in length the two rays arrive in the eyepiece in phase with one another; if there is a difference in the path they arrive out of phase and what are called *interference fringes* are seen in the eyepiece. These are alternate bands of light and darkness and represent the points at which the light waves from the two rays reinforce and extinguish one another. The simplest example of such bands is seen in *Newton's rings* (*qv*). Since white light is a mixture of a number of wave lengths the interference bands produced by it are coloured. When light of one colour is used this is not the case. The distance between any two fringes represents a wave length. In a typical interferometer the path of one or both of the rays can be varied whereby the interference fringes are caused to move; the number of fringes passing across the field of

view need not be a matter of actual distance; the same effect is produced by sending one of the rays which are to interfere through a medium in which the ve-

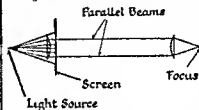


FIG. 1

locity of light is different from that through which the other ray passes. In the Jamin interferometer (Fig. 1) the light is divided by falling obliquely on a thick piece of glass with accurately parallel surfaces: part is reflected at the first surface, part passes through and is reflected at the back surface; the two beams travel parallel with one another to a second glass plate where the processes of reflection are exactly reversed. The two plates must be exactly parallel and exactly equal in thickness and the medium through which the two parallel beams pass must be the same. If any of these conditions are changed interference fringes are produced and the apparatus can therefore be used to measure very slight movements or to compare the refractive indices of two substances. An instrument on a similar principle is Lord Rayleigh's interferometer (Fig. 2) in which the light from a source is sent through two slits in the form of two parallel beams which are brought to a focus in an eyepiece. This instrument has been much used for measuring small differences of refractive index between liquids and gases. The most famous interferometer was that devised by Michelson with the object of detecting a relative motion between the earth and the ether; the failure led to the theory of relativity (*qv*). The Michelson instrument is designed so that the two beams into which the light is split travel over

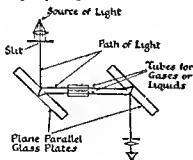


FIG. 2

view is proportional to the change in path in terms of the wave length of the light used.

The difference in path of the light

paths at right angles to one another instead of, as in the Jamin and Rayleigh instruments, parallel. If light were a wave motion in an ether through which the earth is travelling like an airship through the air, the velocity along a path parallel to the earth's motion should be different from that at right angles to it, and interference should result. No such effect is found. See also RELATIVITY.

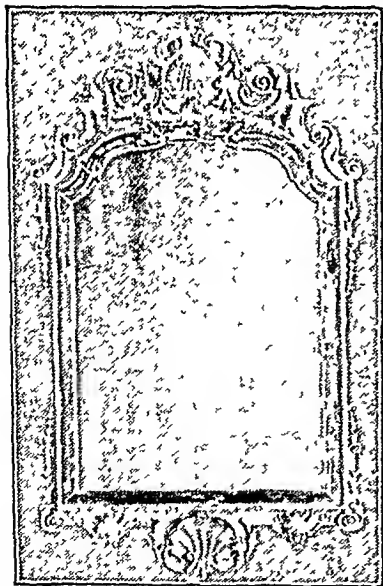
CONSULT L. C. Martin, *An Introduction to Applied Optics* (London, 1930).

Interior Decoration, the art of adorning and furnishing the interior of a house or other building.

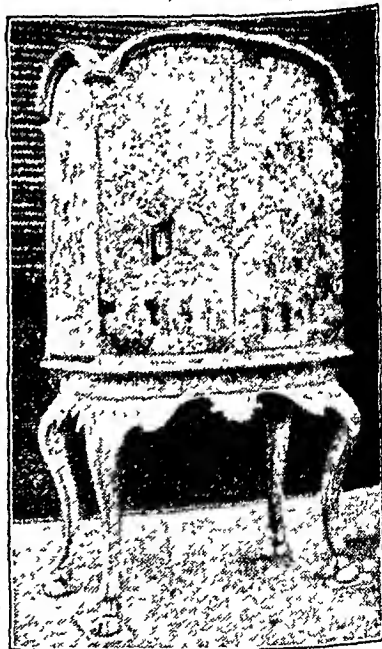
The problem before a decorator is twofold: the adornment of the ceiling, floor, and four walls of the room itself, and the furnishing of the room. Furnishing is distinct from furniture (qv). The latter comprises the objects

placed in a room for use and adornment, the former includes the art of arranging these objects.

The style of an interior is usually predetermined by the general style of the house. An Adam house (or a modern copy) will already have a moulded ceiling, mahogany doors with their decorative architrave, and, possibly, panelled walls and a period fireplace. A Tudor interior will be in a similar state of readiness. In a new house, however, the interior decorator is faced with the beginning of his problem. The treatment of the walls, floor, and ceiling depends, first, on the purpose to which the room is to be put, and secondly, on the style of furnishing desired. If the woodwork is of oak, mahogany, or walnut, the best thing is to leave it alone, occasionally applying

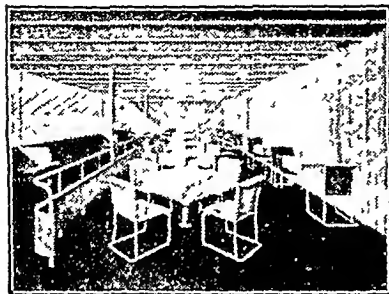


Queen Anne Gilt Walnut Mirror: a style largely replaced during the last decade by the frameless bevelled mirror.



Oriental Lacquer Cabinet on Gesso Stand. A type most popular towards the end of the 18th century.

furnishing scheme and, as a foil for good furniture, should be as unobtrusive as possible. Plain painted walls matching or contrasting with the doors and



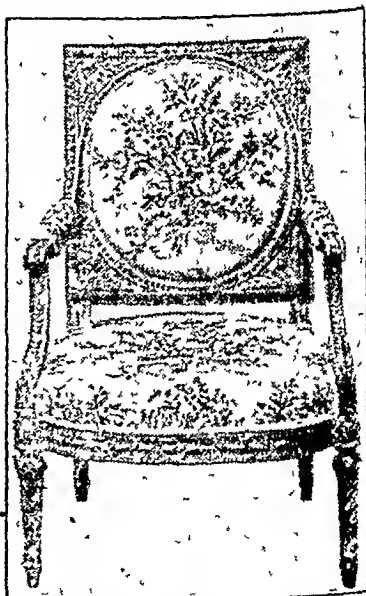
Modern interior influenced by need for light
View of Lounge of Graf Zeppelin

windows give an air of cleanness and space. Opaque glass and tiled walls are more suitable for a kitchen or bathroom than for a sitting-room. Failing paint, a plain cream or light-buff wall-paper or distemper is a fair substitute. A large-patterned paper has the disadvantage of making a room look smaller, besides drawing attention to itself away from the furniture and emphasising the background at the expense of the room. A picture-moulding, which may run directly under the cornice, or from 10 to 18 in. below it, leaving a frieze, not only supports the pictures, but permits any rearrangement of pictures without damage to the walls. It also binds the room together, and does for the top of the walls what the skirting does for their base. The ceiling and frieze may be safely finished in plain white distemper or in a lighter shade of the prevailing paintwork. Wooden ceilings, beamed or coffered, are more suitable for large halls than for private rooms. Black painted or glass ceilings may be attractive to the visitor, but they are unbearable to live with. On no account should a decorative wall-paper frieze be used. Ornamental paper edging is equally to be avoided. The floor, if of oak, may be left to

its own devices. Other woods may be stained, to be polished in the course of the daily housework.

The fire-place, in its literal sense as the focus of the room, is of paramount importance. Care should be taken, in choosing a sitting-room, that there is sufficient space on each side of the fire for an easy chair. A fire-place awkwardly placed in or near a corner is useless in a sitting-room. It is always desirable, in the interests of the general harmony, to remove an ugly Victorian mantelpiece and grate, even if they are in good condition.

The key-note of success in furnishing the house is restraint. Overcrowding and fussiness should be avoided at all costs. Too little furniture is better than too much.

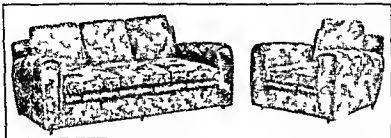


Louis XVI carved and gilt fauteuil covered in old silk

Sun-blinds for windows are useful when the room faces S or S.W. Curtains in summer are purely decorative.

tive in winter they add to the comfort of a room by keeping it warm. Curtains made of such materials as American cloth or oiled silk should be relegated to bathrooms and lavatories.

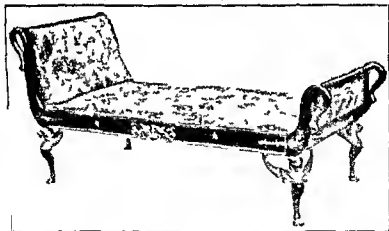
carpets should have underfelt. If the floor is of oak or other hard wood a few Persian rugs are all that is required. Linoleum and cork carpet are suitable for passages.



Modern Settee and Armchair for one.

Carpets or rugs are necessary for comfort. A luxurious but costly and wasteful method is to have an all over carpet fitted to the room. The obvious disadvantage of this form is

nurseries and bathrooms. Hearth furniture should be very carefully chosen. An antique brass fender looks far better than an indifferent kerb. Easy chairs and settees should have

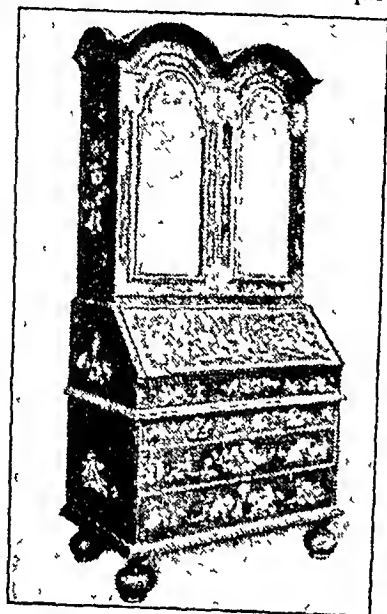


Wiltshire Empire Settee with smock to it.

that the carpet always wears out in specified places where there is most traffic (e.g. by the door). The rectangular carpet can be turned round and is therefore more economical. All

loose covers for cleanliness sake. In the interests of comfort they should be stuffed with hair and have loose down cushions. Some very pleasing modern easy chairs and settees are on

the market When their design and construction are aesthetically correct, they do not clash with the work of the 17th and 18th cents, and the rest of the room may be furnished with antiques.



Queen Anne Lacquer Cabinet with Chinese decorations

Antique easy chairs and settees, though most desirable from the point of view of appearance, are not always very comfortable, with their unsprung webbed seats. The small antique chairs are, however, delightful in every way. A bureau (or bureau-bookcase), or writing-table, two or three small tables (including a card-table), and a decorative chest of drawers or tallboy will almost complete the scheme of a sitting-room.

The dining-room is practically furnished with a dining-table, a set of chairs, a sideboard, and a serving- or side-table. Wireless cabinets and gramophones can become very attractive. As they are essentially modern

objects, it is better to treat them in a modern manner than to disguise them as 18th-cent antiques.

Bedrooms should have, in addition to the bedsteads, fixed wash-stands, built-in wardrobes, two or three antique chests of drawers or dressing-chests, with movable mirrors, and one or two bedside tables. Built-in chests of drawers are permissible, but too much built-in furniture in a room gives an air of deadness and precludes any rearrangement.

A word on pictures may not be out of place. When so many original modern works of art are to be had at a trifling cost, artistic decoration of walls is within the scope of almost everyone's purse. The hanging of pictures is as important as the arrangement of furniture. The picture-cords (wire should never be used) should be emphasised rather than concealed. They should all be the



Interior of a Japanese nobleman's house
Note the virtual absence of furniture

same colour, harmonising with the general colour-scheme, and hung (two for each picture) from the picture-moulding.

The main thing to remember, in planning a decorative scheme, is that

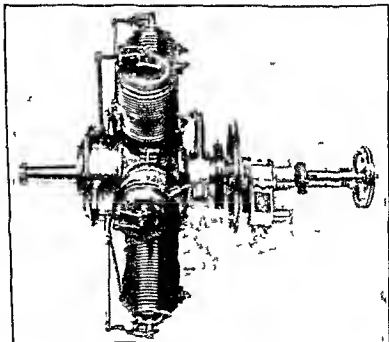
the house has to be lived in That which soothes is better than that which disturbs A house should not be a museum nor a collection of lumber rooms Sparse fine furniture carefully tended in spacious rooms suitably orientated a cautious though not timid blend of plain and patterned surfaces a judicious selection of purely ornamental objects such as pictures and china these are the aims which should inspire the interior decorator See also COLOUR IN THE HOME FURNISHING FURNITURE

Interlocutory Proceedings see PROCEDURE TRIAL.

Interludes, a species of dramatic performance in England which formed a transition stage between the Miracles

or Mysteries (*qv*) and the drama proper They were short enough to be performed in the interval of a banquet or other festivity Their themes were various as is indicated by the titles of the following specimens *Lusty Juventus The Marriage of Wit and Wisdom Skelton's Magnificence and Interlude of the Four Elements* and Heywood's *Play of Love and Dialogue of Gentleness and Nobility*

Internal Combustion Engine An internal combustion engine is one in which mechanical power is derived from chemical energy from fuel burned inside the cylinder itself and not in a boiler as in the steam engine From time to time attempts had been made



Gnome Rotary Engine.

to utilise gunpowder and other combustibles in a power cylinder, but the first really practical engine, embodying modern principles, was that of Otto. He built his first engine in 1876 in Germany, and embodied in it the principles laid down by Beau de Rochas in Paris in 1862 which are (1) maximum cylinder volume, with minimum cooling surface, (2) maximum rapidity of expansion, (3) maximum ratio of expansion; (4) maximum initial pressure of ignited charge. Thus the "Otto Cycle," or what is now known as the "4-stroke" cycle, was evolved, with (1) down stroke of piston—induction, (2) up stroke of piston—compression, (3)

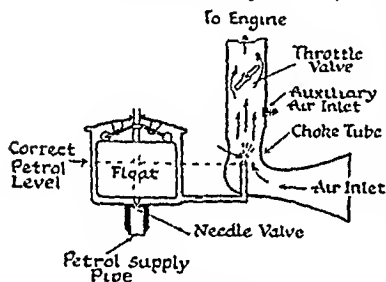


FIG 1—Carburettor

down stroke of piston—firing, (4) up stroke of piston—exhaust

The internal combustion engines at present in use may conveniently be divided into two main types: those having "electric ignition," and those depending on "compression ignition." Under the heading of "electric ignition engines" come the gas engine, petrol engine, and vaporising oil engine. Under the heading, "compression ignition engines," come the Diesel, semi-Diesel, and heavy oil engine.

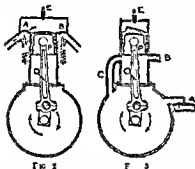
Electric Ignition Engines. For the sake of simplicity single-cylinder engines only are dealt with in this section, the operating principles being the same as those of multi-cylinder engines. When petrol vapour and air are mixed in the correct proportions,

an explosive mixture is created. The mixture is provided by the "carburettor," an instrument provided with a needle valve controlled by a float which maintains a constant level of petrol round the "jets." The jet is provided with a small hole through which the fuel is sucked by the partial vacuum created in the cylinder during the induction stroke of the piston; this suction being regulated by the "choke," tube fitted between the piston and the inlet to the cylinder. The fine spray of petrol coming through the jet is automatically vaporised when it comes in contact with the air in the "induction pipe" (the pipe leading from the carburettor to the cylinders). Prior to combustion the mixture is compressed, in the case of petrol and air the practical maximum is c. 85 lb., for paraffin vapour mixtures about 75 lb., for alcohol mixtures 150 lb. per sq. in. The higher the compression pressure the more efficient the engine, but pressure produces heat, and the limit is imposed by the temperature which would effect spontaneous combustion for the individual fuel.

Fig 1 is a diagrammatic representation of a single-cylinder 4-stroke petrol engine in section. On each side of the top of the cylinder are the valves marked A and B, held down by springs and actuated by cams driven from the crankshaft. For the sake of clearness the cams are not shown. P is the piston and O the connecting rod. The pipe from A is the inlet pipe and leads to the carburettor, that from B being the exhaust pipe to the atmosphere. E is the sparking plug. The piston is shown at the top of its stroke, and the valve A slightly open. As the piston descends, the mixture is sucked in from the cylinder from the carburettor, being closed towards the bottom of the stroke, and on the up stroke of the piston the mixture is compressed. At the top of this stroke a spark occurs at E, exploding the mixture, and driving the piston down. B then opens, and on the next up stroke the burnt gas

are driven out to the exhaust pipe. The cycle is then repeated. The electric current for the spark is produced either by a magneto or a battery and induction coil means being provided to ensure that the spark occurs at exactly the right moment.

Fig 2 shows a section of a 2 stroke engine the piston being at the top of its stroke. A is the inlet port provided with a non return valve. B the exhaust and C the transfer port. Imagine that the space above the piston is already filled with explosive mixture which is about to be fired and that the space below the piston is similarly filled with a mixture drawn in through A from the carburettor.



The explosion drives the piston down and as soon as B is uncovered the burnt gases escape to the atmosphere. The downward movement of the piston also compresses the mixture in the crankcase so that when C is uncovered the mixture is forced through to the cylinder and owing to the shape of the piston helps to expel the spent gases. On the return stroke first B and then C is closed by the piston and the mixture compressed ready for ignition. A partial vacuum is also created in the crankcase due to the upward movement of the piston and thus draws in a fresh supply of mixture ready for the next stroke. The cycle is then repeated.

Diesel Cycle The Diesel engine

(or compression ignition engine) operates in a very similar manner to the petrol engine either on the 2 or 4 stroke principle the main differences being that the compression pressure is sufficient to effect spontaneous combustion and therefore no electric ignition is provided and that pure air only is compressed in the cylinder the fuel being pumped into the cylinder through an injector.

Gas Engines This term is generally accepted to mean a slow running stationary unit having its crankshaft exposed to view and operating on a mixture of coal gas (town gas) and air or producer gas and air. The gas engine may be of the 2 or 4 stroke type and is made in powers from $\frac{1}{2}$ h.p. upwards six or smaller than 6 h.p. or in excess of 250 h.p. being unusual. It is provided with electric ignition either of the magneto or accumulator and coil types.

Oil Engines This term is generally applied to engines of a similar type to those described above but intended to operate on any kind of vaporising oil such as paraffin or kerosene. A vaporiser is needed a device for heating the explosive charge prior to its admission into the cylinder thus making possible its electric ignition at the appropriate moment. This heat is generally derived from the exhaust of the engine once it has been running for a few minutes. For starting purposes petrol is used (being easily vaporised without heat) or the vaporiser is preheated by a blow lamp or other source of heat.

Compression Ignition Engines Compression ignition or heavy-oil engines as they are sometimes called may be divided into three main categories: the full Diesel of the heavy slow running type, the semi-Diesel or hot bulb engine and the modern high speed compression ignition engine which has been developed only during the last few years.

Full Diesel (Slow Speed) Engines of this type are generally not made in smaller sizes than 6-25 h.p. per

cylinder, and range up to 8 cylinder units of several thousand horse-power, as used in large motor ships. This type of full Diesel (generally a 4-stroke) is used only for stationary and marine purposes, and is designed to operate at speeds of between 250 and 500 r p m. On all compression ignition engines the fuel is pumped into the cylinder against the compression pressure at the top of the stroke, and a great deal of ingenuity has been expended on the design of these pumps. In some instances the fuel is itself directly pumped, and in others it is forced by means of a blast of air at very high pressure, the former being on the whole the more satisfactory method.

Semi-Diesel. This type of engine is also of the heavy slow-running order, and generally functions on the 2-stroke cycle. The fuel injection arrangements are similar to those of the full Diesel, the outstanding differences being that the compression ratio is much lower, necessitating external heat for starting purposes. Some types have a portion of the cylinder not cooled, this is generally of globular shape, and is pre-heated by a blow-lamp. When the engine is once started, the uncooled "bulb" in the head remains hot enough to effect ignition, hence the name "hot bulb engine." These engines are made in sizes from c 5-500 h p, and are used for stationary and marine purposes, and occasionally for agricultural tractors, etc.

High-speed Compression Ignition Engines. As stated previously, this type of engine has only recently reached a stage of commercial practicability in its development, and been applied successfully to the propulsion of motor-boats, lorries, and buses.

Coal-dust Engine. Experiments are being carried out in connection with internal-combustion engines, intended to run on coal-dust. The coal is so finely ground as to pour almost like a liquid in the same manner as very finely ground flour. It is blown into the cylinder by air at very high pres-

sure, and is ignited immediately. It comes into contact with the highly compressed air in the cylinder, the cycle of operations being the same as in a Diesel engine.

International, The, *see* SOCIALISM, COMMUNISM, FIRST INTERNATIONAL, ETC.

International Arbitration, *see* ARBITRATION.

International Danube Commission, *see* DANUBE.

International Justice, Permanent Court of, *see* ARBITRATION, PERMANENT COURT OF INTERNATIONAL JUSTICE.

International Labour Office, a department of the League of Nations, provision for the foundation of which was laid down in Part XIII of the Treaty of Versailles. Its objects are to encourage a better feeling between employers and employed, a more dignified conception of labour, payment of wages sufficient to maintain a reasonable standard of life, universal acceptance of the 8-hour day, equality of men's and women's wages, protection of young working people, and similar ideals. It consists of a General Conference of 2 delegates from each nation represented in the League, as well as 2 from Brazil, each pair consisting of one representative of the employers and one of the employed. Its Executive Board numbers 24 members, 12 being Governmental delegates. Eight industrial States are represented, and the equality of workers and employers is always preserved.

The Board meets 4 times annually, usually at Geneva, where the Office, with a staff of 360, is situated.

International Law, that body of law governing States in their relations with one another as distinguished from national or municipal law, which, in a State, regulates the conduct of its citizens. Already in the Middle Ages the growth of civilization, of international commerce, and relations had resulted in the development of customs to meet particular

cases these were unsystematic how ever and by no means universally or regularly observed In 1675 the Dutch jurist Hugo Grotius published his *De Jure Belli et Pacis* (Concerning the law of War and Peace) which systematised and added to such rules as existed becoming the foundation of modern international law The rules of international law are in effect accepted by the States as binding on them e.g. the Declaration of Aix la Chapelle 1818 But the experiences of the 19th cent had in practice extended the terms some what and accordingly the present rules of international law may be classified under three heads (a) universal which all the States accept e.g. that relating to diplomatic privileges (b) particular which generally result from treaties and bind only their signatories (c) general which are accepted by many States and have a tendency to become universal e.g. The Hague Conventions 1899 and 1907 We find therefore that international law develops from two sources—custom and treaties The former is the older and owes much to the writings of jurists such as Grotius to the decisions of prize courts to State ordinances etc The latter is comparatively modern

International law being the body of law which regulates the relations of civilised States with one another is based on two principles (a) internal and external sovereignty of each State (b) mutual recognition of that sovereignty (see STATE SOVEREIGNTY) From these principles flow the rules which make up international law which may be classified as follows (1) rights of independence and self preservation (2) rights of intervention in matters affecting State interests (3) State supremacy within territorial limits (this includes full legislative and judicial power in regard to nationals and aliens within the territorial limits) (4) rights of equality and dignity such as rights of

precedence the right to respect for the flag etc (5) rights over State territory (6) responsibility for the acts of servants and nationals (7) rights of legation and diplomatic privileges (8) rights of negotiation and treaties All these rules are rules governing the States in peace time and to them must be added the laws of war many of which particularly those governing the conduct of war the treatment of prisoners etc have been established by treaty See LEAGUE OF NATIONS NEUTRALITY BLOCKADE ETC

International Settlements Bank of,
see BANK OF INTERNATIONAL SETTLEMENTS

Intestacy the position when a person dies leaving either no will (q.v.) or a will which is invalid Until 1925 the destination of an intestate's property differed according to whether it was realty or personalty but the position has been revolutionised by the Administration of Estates Act 1925 which directs that all the property is to vest in the *personal representatives* (q.v.) upon trust to convert into money and lays down new rules for the distribution of the *residue of estate* i.e. the residue of the money after all the debts of the deceased have been paid These are (1) The spouse if living takes the *personal chattels* and £1000 free of death duties and costs with interest at 5 per cent. from the death If the intestate left no issue the spouse also takes a life interest in the residue and in default of any statutory next-of-kin holds the residue absolutely If the intestate left issue the spouse takes a life interest in half the estate *Personal chattels* denotes household furniture and effects motors domestic animals pictures etc (2) Subject to the rights of the surviving spouse the residuary estate is held upon *statutory trust* to be divided equally among the children alive at the death of the intestate as soon as they attain 21 or marry The share of a child dying before the intestate goes to the issue of that child (3) Where there is no

issue, the estate, subject to the rights of the surviving spouse, goes to the parents of the intestate (4) If there are no issue or parents, then, subject to the rights of the surviving spouse, the estate is held upon *statutory trust* for the other surviving relatives in the following order, each class in which any member acquires an interest entirely excluding the later class (a) whole-blood brothers and sisters of the intestate, (b) half-blood brothers and sisters, (c) grandparents, (d) whole-blood uncles and aunts, (e) half-blood uncles and aunts The issue of a person who would have been entitled to share had he not predeceased the intestate "represents" that issue, so that nephews and nieces can take under (a) or (b)

In certain cases, *e.g.* entailed interests, or where in a will the testator leaves his real or personal property to his heirs, the old canons, or rules, of descent still obtain The most important are (1) In every case descent is traced from the last *purchaser*, *i.e.* the last person to acquire the land otherwise than by descent Thus if A dies owner of an estate which descended to him on the intestacy of B, his father, by whom it was originally purchased, the claimant must prove that he is heir not to A but to B (2) Inheritances in the first place descend lineally to the issue of the purchaser, *e.g.* a grandson, to the exclusion of his mother, may inherit from a paternal grandfather if his own father be dead (3) Between persons in the same degree, males are preferred to females, and among males in the same degree, the elder is preferred to the younger, but females in the same degree take equally (4) The issue *ad infinitum* of any deceased person in the line of descent represent their deceased ancestor, being preferred amongst themselves according to rule (3) Thus, the grandchild of the eldest son succeeds before the younger son (5) On failure of issue, the inheritance goes to the nearest lineal ancestor and that ancestor's issue, paternal ancestors

being preferred to maternal *See also* WILLS, PERSONAL REPRESENTATIVE

Intestines, see BOWELS

Intuition, a term used in philosophy and in common parlance, to cover a number of meanings It is broadly applied to judgments made without recourse to inference or indirect reasoning, but beyond that it is employed in very different senses, ranging from the mere direct perception of sense-data, to the almost supernatural judgment sometimes also called inspiration—usually the cloak for a prejudice which can find no more reasoned support

The expression is used in rather a different way by Spinoza, who makes it the highest form of human knowledge *See also* ETHICS

Inulin, a naturally occurring carbohydrate found in the roots of the dahlia It is employed in the manufacture of fructose (*qv*), which it yields on hydrolysis It is also used in the production of bread intended for diabetics

Invar, an alloy of iron, with 36 per cent nickel Its coefficient of expansion with temperature is extremely small, whilst its mechanical qualities, resistance to rust, and ease of working are satisfactory It is therefore much used for the balance-wheels and pendulums of watches and clocks and for tapes, chains, and wires used for measurements in surveying land, where one of the chief limits to accuracy has always been the difficulty of knowing the average temperature of the measuring line used Unfortunately, invar increases very slightly in length with time, though only very slowly after the first year or two *See also* IRON AND STEEL, NICKEL

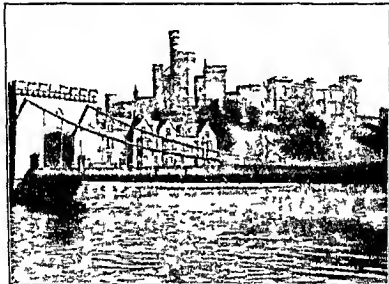
Inverness (or *Inverness-shire*), the largest Scottish county, occupies a central position in the Highlands between Perth and Argyll on the S, and Ross and Cromarty on the N The shire extends from the Hebrides to the Beaully and Inverness Firths, which lead into the North Sea, and is nearly bisected from NE to SW by

Glenmore The surface is rugged and mountainous. Ben Nevis (4400 ft) the highest peak in Great Britain is situated here. There are a large number of rivers and freshwater lochs. The longest rivers are the Spey and Findhorn. Lochs Ness, Shiel, Lochy and Erich are of considerable size and famous for their beauty.

Agriculture is mainly carried on by small holders or crofters. Cattle

at the point where Glenmore finds its way to the North Sea. It is a port, an important railway centre and the chief market of the Highlands. It was at one time the capital of a Pictish kingdom. Pop c 1000.

Invertebrates, general term for all animals which have no back bone or vertebral column. It is not however now used to signify a natural division of animals.



Inverness Castle as it appears from 1838 on the R. Ness.

and sheep are extensively grazed. At Fort William near the S.E. end of Glenmore large hydro electrical plants have been installed. The principal industry is distilling artificial fertilisers and some textiles are manufactured near Inverness. The fishing industry is important. The chief towns are Inverness the capital and Fort William. Area 4211 sq. m. pop (1931) 8° 08. () Capital of the county of Inverness-shire situated in the N.E. of the county on the R. Ness.

Invert Sugar a mixture of *d* glucose and *l* fructose which is obtained by the hydrolysis of cane sugar or sucrose (*qv*). Invert sugar is sweeter than ordinary sugar and is used in the manufacture of various wines and in the preparation of baby foods.

Invisible Exports and Imports In visible exports are those items in a country's balance of international payments for which that country receives payments apart from exports of merchandise and bullion. *sg* ship-

ping and banking service, interest on loans, insurance premiums, tourist expenditures, etc. Invisible imports are those items for which a country makes payments abroad apart from imports of merchandise and bullion. They are the same as the items above mentioned. *See also* BALANCE OF PAYMENTS

Iodine, a non-metallic element belonging to the group known as the halogens (*q v*). Iodine is not found in the free state, but in combination it is widely distributed, occurring principally in the Chilean nitrate deposits in the form of sodium iodate, in the ashes of sea-weed, in the waters of certain springs, and in sea-water. It is also found as one of the constituents of the thyroid gland (*see below*). Iodine occurs in the form of brilliant black crystals which volatilise with the formation of a violet vapour. Iodine is only very slightly soluble in water, but it dissolves readily in some organic solvents, such as alcohol and chloroform, and also in an aqueous solution of potassium iodide (*see ELEMENTS*).

Iodine is of great commercial importance, and finds utilisation in several fields. In the form of its alcoholic solution (tincture of iodine), it is widely employed as an antiseptic.

Iodine is a vital constituent of the substance thyroxin (*q v*), which is the active principle of the thyroid gland (*q v*) and small amounts of it are therefore essential in diet.

Iodine Compounds are chemically similar to the compounds of the other halogens. Iodine forms hydriodic acid, HI, which corresponds to hydrochloric acid (*q v*), the aqueous solution is employed in organic chemistry as a reducing agent. The iodides find considerable employment in medicine.

Iodoform, or triiodomethane, CHI₃, the iodine analogue of chloroform, used considerably in surgery as an antiseptic in dressing wounds.

Ion, *see* AROU

Iona (or *Columbkull*), small Hebridean island close to the coast of Mull off Argyllshire, from which it is separated

by the Sound of Iona. St Columba founded a monastery on the island in A.D. 563, which became a famous centre of Celtic missionary effort. The original monastery was destroyed by the Norsemen. Iona was a bishopric in the Middle Ages, the cathedral dates from the 13th cent., and a large part is still standing. The ruined St Oran's Chapel, built by Queen Margaret, c. 1080, is the oldest building on the island. Area, 3 sq m., pop. c. 250.

Ionian, district on the W coast of Asia Minor, which, with the adjacent islands, was colonised by the ancient Greeks of Ionian race. The colonies or cities were united by a religious rather than a political bond. The Asiatic Ionians were somewhat despised as unmanly and plutocratic, but they appear to have displayed a considerable commercial and artistic genius, and Athens, in particular, owed much to their learning. The Ionians fell first under the sway of their Lydian neighbours (6th cent. B.C.), and later were conquered by the Persians. The Ionian Revolt against the Persians in 490 B.C. involved Athens and Eretria and led to the Persian Wars against Greece (*see GREEK HISTORY*). After the defeat of the Persians at Mycale (479 B.C.) Iona was incorporated in the Athenian Empire, and shared its later fortunes.

Ionian Islands, archipelago fringing the W coast of Greece, comprising Zante, Corfu, Cephalonia, Ithaca, Cythera, Santa Maura, and Paxos. Ithaca was the home of Ulysses (*q v*). The islands are rich in minerals—marble, salt, coal, and sulphur. Fruit is grown and wine manufactured. They form an administrative division of Greece. Area, 740 sq m., pop. (1928) 213,200.

Ionian Philosophers, *see* PHILOSOPHY, ANCIENT

Ionians, a Greek race dwelling in Attica, Eubœa, some islands in the Aegean, and that part of Asia Minor called Ionia (*q v*). The Ionians had a common Greek dialect, and often acted together politically. The Delian

Confederacy (qv) was a league of Ionian city States led by Athens. It is doubtful from whence they came; tradition asserts that they were originally inhabitants of the Peloponnese before the time of the Achaeans or Dorians. It has been held that they originated in Asia Minor.

Ionic Order the second of the Greek orders (*see* OADPA). The column stands on a base, the 24 flutes of the shaft are separated by fillets instead of by a sharp edge as in Doric; the capital has 4 spiral volutes or scrolls. The architrave is formed of 3 slabs, the second projecting slightly above the first and the third above the second; the frieze is plain. There is a dental cornice. The Roman version of Ionic has a plain shaft, smaller volutes and a larger entablature. Greek examples: the Erechtheum and Temple of Nike, Athens; Temple of Diana, Ephesus. Roman: Temple of Iortuna, Vindes; second range of the Colosseum, Rome.

Iowa, State of U.S.A. situated in the Middle West between Minnesota on the N. and Missouri on the S. immediately W. of the Mississippi R. The State is part of the great central agricultural plain of N. America. Corn is the main crop; wheat, oats and hay are also valuable. There is a large coalfield and some lead is found. The principal industry is meat packing. Communications are highly developed and there is a large volume of waterborne traffic on the Mississippi and the Missouri. The State capital is at Des Moines (14 600); the State university at Iowa City. Area 56 147 sq. m. pop. (1930) 2 409 59.

Ipecacuanha (*Psychotria speciosa*) a Brazilian plant of the family Rubiaceae; shrubby in habit, the dried roots of which are used in medicine. It is employed as an emetic, particularly when there is difficulty in breathing as in cases of bronchitis or laryngitis, and has also a stimulating effect on the mucous membrane of the lungs, producing coughing. It is also used in the treatment of dysentery as a laxative.

The name *ipecacuanha* is also given to various other plants.

Iphigenia [171] [141 A] in Greek legend the daughter of Agamemnon and Clytemnestra. At Aulis where the Greeks on their way to attack Troy were kept by adverse winds, it was prophesied that only the sacrifice of Iphigenia could procure a favourable breeze. Her horror when she became aware of her fate and her prayers and entreaties make one of the most tragic scenes in classical mythology. As the blow was struck, Iphigenia vanished and a goat took her place on the altar. She was carried away by Diana to Tauris where she presided over her temple. When it became her duty to sacrifice her brother Orestes, she fled with him, taking with her Diana's statue which is said to have been set up at Aricia in Italy.

Ipswich (1) County town of Suffolk 10 m. from the mouth of the R. Orwell. Chief industries are agricultural engineering, chemical fertilisers and oil cake and there are some important tanneries. The principal churches include several fine specimens of perpendicular architecture. There is a 15th-cent. grammar school. Thomas Wolsey was born in the town. Pop. (1931) 87 600.

(2) A town in Queensland, Australia, 25 m. S.W. of Brisbane. It is in the centre of a coal-mining and industrial area and has railway works, textile and saw mills. It has grown rapidly during the present century. Pop. c. 26 300.

Iran, geographical area in S.W. Asia comprising the enormous tableland between the valleys of the Indus and the Tigris, extending from the Arabian Sea to the deserts of Turkestan and including most of Persia and Afghanistan and all Baluchistan. Mountain buttresses flank the plateau everywhere, rising to great heights on the N. and E. The interior is a vast saline desert. Iran gives its name to an important branch of the Oriental Aryan languages. *See* INDO-EUROPEAN LANGUAGE, PERSIA.

Iranian Language. An Eastern branch of the family of Indo-European Languages (*qv*) which, together with Sanskrit and its descendants, forms the Aryan or Indo-Iranian group. Of ancient Iranian languages, only one word of Median has survived. Avestic or Zend is the language of sacred Zoroastrian literature, and Old Persian is the parent of Modern Persian, the most important member of the Iranian group. Chronologically intermediate between Old and Modern Persian is Pahlavi, or Middle Persian, the language of later Zoroastrian writings. Modern Persian uses the Arabic alphabet, and has borrowed extensively from Arabic and Turkish. Other modern Iranian languages are Kurdish, Afghan (Pushtu), and the Caspian languages.

Iraq [*L'RAHK*], modern kingdom of Mesopotamia, embracing the joint valleys of the Euphrates-Tigris, between Turkish Kurdistan and the Persian Gulf, having Persia on the E and Arabia, Palestine, and Syria on the W. The frontiers are not clearly defined, but the area of the country is given in recent estimates as 177,150 sq m.

Economic Importance. Irrigation at one time rendered Mesopotamia one of the granaries of the world, but Turkish rule wrought such havoc that Iraq must be regarded rather as a country of immense possibilities than of present importance. Some 1600 sq m only are at present under irrigation. Cereals and tobacco are cultivated in the uplands towards Kurdistan, and a deliberate effort is being made to stimulate the cultivation of cotton. Large flocks graze the frontier hills and provide for the extensive export trade in wool. Dates are largely grown on the lower river. The petroleum deposits of the N and NE are of great importance, and are financed by British capital, and British interests have built extensive refineries in the S. A pipeline has been constructed across the desert to Palestine. The unit of

currency is the dinar, which equals £1 sterling at par.

Population. The bulk of the inhabitants are of Arabic race, the dwellers in the border hills, however, are mainly Kurdish, and there are a few centres of Turcoman population and Assyrian settlements in the North. Mohammedanism is the prevailing religion. The principal concentration of population is in the deltaic area,



A Mabel, native boat, on the Shatt-el Arab, Basra.

but there is fairly even distribution through the river valleys. The largest town is Baghdad (*c* 250,000). Other important towns are Basra, Mosul, and Samarra. Pop. at the last census (1920) 2,849,300.

Communications. About 750 m of rail and 5000 m of road were open in 1932. Motor services traverse the desert to Beirut and link up with Turkish railways, and London has been reached in a week by the overland

route from Baghdad. There are air services from Baghdad to Cairo, Persia and Syria.

Government and Education. Iraq became a constitutional monarchy under a Law passed by a Constituent Assembly in 1924. King Faisal who had been elected its first ruler by plebs cite in 1921 opened his first Parliament in 1925. The Senate comprises 70 nominated members, the Lower House 88 elected deputies. There are some 300 State-controlled primary schools and secondary and technical education are reasonably well provided for. The first block of buildings for the new university was opened in 1926.

Relief and Climate. Mesopotamia consists of an alluvial plain rising N and E to the rolling foothills of the Kurdish mountains. S and E of the Euphrates the cultivable plain merges into the vast deserts of N. Arabia, Transjordan and Syria. The climate is unhealthy through the presence of malaria and owing to deficient sanitation, bubonic plague, typhus and cholera are prevalent. Rainfall is slight and confined to the winter months.

History. A number of powerful and opulent civilisations have flourished in the basin of the twin rivers of Mesopotamia, of which the earliest that of the Sumerians had reached a high level by 4000 B.C. The centres of government seem to have shifted within the Sumerian State according to the fluctuation of dynastic fortunes and Kish, Ur, Uruk and Erech among others are among the early capital cities. From Semitic immigrations whose leaders gained power after 2750 B.C. arose the later empires of Assyria and Babylonia (q.v.). The conquests of the Persian Cyrus in the 6th cent. B.C. mark a period of Aryan supremacy. Greek influence however under the Seleucid dynasty does not seem to have been as powerful as in other parts of the Macedonian Empire. Rome at no time enjoyed undisputed authority in Mesopotamia and had to struggle persistently with the Parthians

and later with the revived Persian Empire of the Scythian Sassanids. The desperate wars between the Byzantines and Persia from the early 6th cent. to the early 7th exhausted both sides and the Mohammedan Arabs rent Syria, Palestine and Mesopotamia from the rival Powers almost at a blow completely overthrowing the Persian Empire. From that time until the Turkish conquest in the 11th cent. Mesopotamia was ruled by the Arabian caliphs whose power culminated in the reign of Harun al Rashid the contemporary of Charlemagne. The Caliphate declined from internal dissensions and following Saracen invasion.

In spite of the Kurdish Saladin's enlightened rule Mesopotamia continued to decline in the Middle Ages. A terrible Mongolian orgy of destruction by a descendant of Genghis Khan rounded off the process (A.D. 1258-9). After a period of chaos the Osmanli Turks conquered the region in the 16th cent.

The Turks during the 19th and early 20th cents. initiated some reforms especially in the direction of resettlement but the general corruption of their governmental machinery rendered them intensely unpopular and the nationalist sentiment which was fermenting in Syria and Arabia began to appear in Mesopotamia upon the eve of the World War.

At the close of the War the British forces occupied almost the whole of Mesopotamia and the Allies announced their intention of encouraging the formation of an Arab State on a basis of self-determination. But there was delay in implementing the promise and Britain accepted a mandatory authority over the region from the League of Nations, a step which precipitated a nationalist revolt in 1920. In 1921 came the election of the Emir Faisal as King. The young State however was threatened by the neighbouring Arab kingdom of Nejd and also by the revived nationalism of Turkey. British operations during

1922-3 ended the Turkish menace, which had become acute with the triumphs of Mustapha Kemal. The difficulties with Nejd were adjusted in 1925, Britain formally recognising Iraq as an independent State in 1927. In 1932 Iraq entered the League of Nations. Faisal died in 1933 and he was succeeded by his son, as King Ghazi.

CONSULT Gertrude L. Bell, *Review of the Civil Administration of Mesopotamia*, S. H. Longrigg, *Four Centuries of Modern Iraq*, *Draft Mandates for Palestine and Iraq*.

Ireland, large island to the W of Great Britain, a constituent part of the British Commonwealth, comprising the Irish Free State and Northern Ireland (qqv). It is bounded N, S, and W by the Atlantic and E by North Channel, the Irish Sea, and St. George's Channel. Much of the surface consists of low-lying ground, with scattered groups of mountains and hills around the coasts and S and W of Lough Derg. The chief heights are the Wicklow Mountains in the E, the Sperrin Mountains and Donegal Mountains in the N, several small groups in Connaught, the mountains of Kerry in the S W, and the Comeragh group in the S. Much of the E coast is fairly unbroken, but the others are deeply indented, forming innumerable loughs and bays. There are numbers of islands off the W and S W coasts.

The chief rivers are the Shannon which rises in co. Cavan, and flows through several loughs in a generally S direction, and then turns W into the Atlantic, and the Boyne, Foyle, Liffey, Suir, Blackwater, and Barrow. The configuration of the land, with mountains surrounding an interior plain, has led to the formation of much bogland, and a number of lakes, some of them extremely picturesque, of which the largest are Loughs Neagh, Erne, Ree, Corrib, Mask, and Derg. The climate is similar to that of England, but with a larger rainfall over most areas. For production,

trade, government, etc., see IRISH FREE STATE, and NORTHERN IRELAND.

History. The earliest inhabitants of Ireland of whom anything is definitely known were the Celts. Under them the country was split into a number of lordships which gradually coalesced into definite "kingdoms," similar to those of early England. Christianity was introduced in the 5th cent., and spread rapidly from Ulster, the domain of the "high king," all over the country. Monasteries became centres of national culture and fostered agriculture and domestic arts. From the 8th cent. the country suffered much from Danish raids, and the Danes gradually began to settle,



Blackrock Castle, Cork

and could not be dislodged, until, at the threat of an invasion, the Irish kings joined forces and decisively defeated them at the battle of Clontarf in the early 11th cent.

A papal bull of 1155 made over Ireland to Henry II of England if he could restore State and Church to order. Henry by conquest forced acceptance upon all the Kings of Ireland except those of Connaught and Ulster, and granted large possessions to various earls under himself. During the early 14th cent. a strong central authority was established by the crushing of the rising under Robert Bruce's brother. More territory passed into the hands of English earls, and a steady discontent began to be felt. Powerful Irish fami-

lies such as the O'Neills however gradually gained authority by inter marriage and the general absorption of the English. In the middle of the 14th cent these great families were in so strong a position that Lionel Duke of Clarence was sent as Viceroy to Ireland and enacted the Statute of Kilkenny (1366) which named a number of territories as definitely English and forbade intermarriage and the use by the Anglo-Irish of Irish customs and language. These efforts were of little avail however for so soon as a strong viceroy was replaced by a weaker one the Irish fusion went on apace and the country was not far from independence at the end of the 15th cent.

Under the Tudors the most vigorous efforts were made to anglicise the country and secure the allegiance of the great Anglo-Irish nobles. At the dissolution of the monasteries church lands were offered as bribes and preferment and authority in the new church were given to supporters of the new régime. But the main result was to produce a more strongly united and Catholic Ireland with a bitter dislike for the English. Only in Ulster did the steady pressure succeed in its object and at the flight of the earls in 1607 from the province James I seized 500 000 acres and planted Ulster with Scottish and English settlers which made it as it has since remained the most Protestant part of the country. The insurrection which broke out in Ireland in 1641 coincided with the Civil War in England that put Cromwell in power. Cromwell afterwards subdued Ireland. Huge tracts of Irish territory were confiscated and estates reduced to reward the victors although the subsequent restoration of the monarchy enabled the deprived Irish to recover some but not much of their possessions. The result was another rising in support of James II after he had fled via France to Ireland in 1688-9. Londonderry was besieged and hostilities continued until William III took over an army. He met and defeated James and the

Irish Catholics at the Battle of the Boyne in 1690. The Catholics were excluded from the Dublin Parliament and the deadlock which existed until after the World War had begun to be established. At the beginning of the 18th cent a penal code was put into operation which prevented the Catholics from voting teaching owning land except under the most onerous conditions and from following professional vocations.

For the next half-century the Irish steadily sank under these burdens and the beginnings of a revolutionary nationalist policy were born. Under influential men it succeeded by 1789 in securing the Irish Constitution a measure allowing a little more freedom especially in matters of domestic policy. In 1798 came an insurrection which was crushed with a loss of thousands of lives and at the close of the century Pitt succeeded in establishing the complete union of the two countries.

Subsequently largely through the efforts of Grattan and O'Connell the Catholic Emancipation Act was passed in 1829 and removed most of the encumbrances a further effort which aimed at a repeal of the Act of Union was unsuccessful. During this and the following periods Ireland shared in the prosperity which began to be fairly widely established. But the great potato famine of 1846- caused widespread distress and began the movement for land reform which culminated in the 1891 Land Act and the 1885 Land Purchase Act whereby tenants might borrow money from the State to purchase the land they occupied. Later the Balfour Government passed an Act which extended land purchase on a great scale. The tenants repaid by yearly instalments but after Mr de Valera's accession to office in the Irish Free State the Irish Free State Government refused to remit these annuities to England. This led to the tariff war between Great Britain and the Irish Free State.

The next step was the movement for

Home Rule The Home Rule Party attempted to secure this through constitutional channels, and by various secret societies, most notably the Fenian Society, and more important still by the Land League, founded by Parnell Gladstone's Irish Bills offered a certain measure of what was demanded The 1913 Bill was eventually passed after rejection by the House of Lords, but the World War intervened

After the outbreak of the World War the younger Irish generation revived the old cry that "England's danger is Ireland's opportunity," and Griffith's Sinn Féin movement for an entirely independent Ireland rapidly gained ground Help was promised from Germany, a citizen army was recruited and revolution broke out in 1916 England, after putting down the movement by force, negotiated for a settlement, but matters remained at a deadlock, with Irish feeling gaining force, until 1918, when the Sinn Féiners assumed power, and established the Dáil, or National Parliament A sporadic war broke out in 1919 between England and the Sinn Féiners, and lasted for 2 years It consisted of guerrilla fighting, ambush, and terrorism In 1921 a settlement was arrived at, whereby the separate States of the Irish Free State and Northern Ireland (*qqv*) came into being Arthur Griffith and Michael Collins accepted the Treaty, but de Valera refused to accept it

Ireland, Church of. In 431 Pope Celestine I consecrated Palladius and sent him on a mission to Ireland to spread the Gospel It was through this introduction of Christianity that Patrick, said to have been captured from his father's farm near Boulogne and sold to an Irish chieftain, vowed—on obtaining his liberty—to labour for the conversion of the heathen amongst whom he had sojourned in bondage After receiving consecration, Patrick landed in Ireland between 440 and 460, and until the 11th cent the Celtic Church flourished, producing its saints and scholars, though not recognising

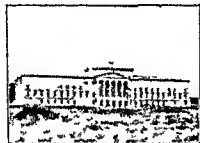
Papal authority until 1152 In 1534 George Browne became the first Protestant Archbishop of Dublin, and shortly after, 370 monasteries were suppressed The Churches of England and Ireland were united by the Act of Union of 1800, but in 1869 a Bill was passed disestablishing and disendowing the Irish Church The Anglican Church in Ireland has now 2 archbishops and 11 bishops, whilst the Roman Catholic Church has 1 archbishop and 21 bishops

Ireland, John (b 1879), one of the most notable modern English composers, best known for his setting of Massfield's *Sra Fever*. He was born at Bowdon, Cheshire, and studied at the Royal College of Music Apart from some fine songs Ireland's best work is found in his chamber music, such as his 'cello and piano sonatas, and notably in his sonata for violin and piano

Ireland, Northern, that portion of the British Isles comprising the nine Irish counties of Antrim, Armagh, Down, Fermanagh, Londonderry, and Tyrone The capital is Belfast For general geography, and history up to 1921, *see* IRELAND The main crops are oats, potatoes, green vegetables, wheat and other cereals, fruit, and hay There is abundance of cattle, sheep, pigs, horses, and goats, as well as numbers of poultry Much of the land is owned by the farmers The district is not rich in minerals, though there are deposits of chalk, clay, stone, and iron ore The principal manufactures are linen and shipbuilding, both of which are centred in Belfast Smaller industries are ropemaking, tobacco, distilling, and clothing Other chief towns are Londonderry, Armagh, Lifford, and Downpatrick Education is at a good standard, and the chief university is at Belfast The population is fairly equally divided between Catholics, Presbyterians, and Protestant Episcopalians

Government is carried on by a governor, assisted by a senate and a House of Commons These bodies are

not responsible for foreign affairs external trade postal services etc which remain in the hands of the British Government Northern Ireland sends 13 members to the Imperial House of Commons The main political difficulty after the establishment of the Irish Free State the boundary question was settled (1925) by a commission appointed by the 3 Governments Taxation is levied and collected by the Imperial Government and remitted to the Ulster exchequer after incidental amounts for defence etc have been deducted and the fiscal system is the same as that of



Stormont Hou N Ire) d P liam t
Great Britain Area 6236 sq m
pop (1926) 126561

Ireton, Henry (1611-1631) general in the Parliamentary Army during the Civil War and son in law of Cromwell He took part in the campaigns under Essex and later under Manchester commanding the left wing at Naseby He served under Cromwell in Ireland and remained in command when Cromwell left for Scotland

Iridium, a rare heavy white hard metal (see ELEMENTS) belonging to the group of platinum metals It is found in some platinum ores in the form of osmiridium (*os*). The separation of osmium and iridium is a fairly easy matter owing to the easy oxidisability of the former metal Iridium is employed in the form of an alloy with platinum (90 per cent) for the manufacture of tips for fountain pen nibs

(which are not attacked even by aqua regia) for laboratory use It was also used for the construction of the standard metre which is kept at Paris

Iris, in Greek mythology one of the Oceanides the attendant of Juno and messenger of the gods was also the goddess of the rainbow

Iris (*Flag Orris Root Fleur de Luce*) hardy evergreen plants with sword shaped leaves and bulbous roots One species is a common plant 3-5 ft high beside rivers and in marshes with large handsome yellow flowers *Iris florentina* is the white iris of gardens and *iris germanica* the common purple flag There are innumerable species many of great beauty found all over the world and many have been brought to England and can now be grown here from bulbs or rhizomes

Irish Free State (*Saorstát Éireann*) a self governing dominion of the British Empire For geography and history to 1921 see IRELAND

The principal occupations of the people are agriculture and industries connected with agriculture There is a good deal of bogland and other barren stretches but much is fertile and produces good crops of potatoes turnips and other vegetables oats barley sugar beet flax and hay Of the total surface about two-thirds is given over to crops and grazing Very large numbers of cattle are raised and some sheep pigs and other live stock

There are a number of industries of which the chief are flour milling brewing clothing timber dairy produce linen tanning and various foodstuffs The principal imports are manufactured goods coal and cereals There are no minerals of value in the country To stimulate industry high tariffs have been introduced State grants subsidies and electrification in which connection the Shannon water-power scheme is the main source of supply The coastal river and lake fisheries are of value and employ more than 100,000 people The chief towns are Dublin, the capital, Cork, Water-

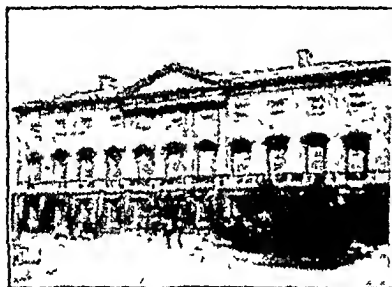
ford, Limerick, Wexford, Galway, and Wicklow.

Communications are fairly well established, although somewhat primitive in remote parts of the country.

Education is free and compulsory in elementary schools, and the Irish language is a compulsory subject.

The universities are Dublin, Cork, and Galway. The bulk of the population is Roman Catholic, and there are Protestant Episcopalians and a few members of other denominations.

Government, of which the King, represented by a Governor-General, is the head, is administered by an executive responsible to a chamber of deputies of 153 members (the Dáil



The Dáil, Dublin

Eireann), and a Senate of 60 members (the Seanad Éireann). Members are elected to the Dáil by universal suffrage. The executive consists of the President and a small Cabinet. Local government is carried on through 27 counties, which are subdivided into rural districts.

The history of the Irish Free State has been a turbulent one. The first Government, established before the treaty with Great Britain, proclaimed itself Republican. Negotiations with the British Government were opened, and upon the terms being made known de Valera, leading the Republican members, resigned the Presidency and left the Dáil with his immediate followers. The treaty was accepted by a very narrow

majority, and soon afterwards civil war broke out. The Republicans were defeated, de Valera escaped, but Arthur Griffith, the President-elect, died, and Michael Collins, the head of the Free State Army, was ambushed and shot. Mr Cosgrave, Griffith's successor, undertook the task of restoring order. This task proved to be a formidable one, and when the treaty with Great Britain took effect, with Cosgrave President of the executive, the country was a prey to warring and bitterly opposed factions, and suffering from anarchy and violence of all kinds.

The new Government took the situation ruthlessly in hand, and by the middle of the year the Republicans had abandoned hostilities, and most of the extremists had been imprisoned or executed. By the time of the General Election of 1927 considerable progress and reorganisation had been achieved, and the Government, though unpopular for its restrictive measures and high taxation, had served well. At this election there was a large increase of Republicans returned, and Mr Cosgrave's majority was an unworkable one. Events were upset by the murder of Kevin O'Higgins, the Vice-President of the executive council, for which the Republicans were blamed, though de Valera repudiated the act. Although the Cosgrave Government slightly increased its majority, Republicanism grew steadily during the next few years, and in the election of 1932 de Valera was returned to power with a narrow Republican majority. Near the beginning of his term of office his Government declined to pay Britain the land annuities (see IRELAND, HISTORY), and reprisal tariffs were instituted by Britain. An event of some political significance was the formation by General O'Duffy in 1933 of a National Party whose aim was closer co-operation with England, and the conclusion of an agreement with the Cosgrave Party and others.

In the autumn of 1933 Mr. de Valera introduced three Bills with the object of

making the State an independent Republic totally dissociated from the Crown and the British Empire and these were passed by the Dail in November. The British Government stated in Parliament that these measures were a breach of the Treaty like Mr de Valera's previous abolition of the Oath of Allegiance and the withholding of the land annuities.

Irkutsk, city in the Siberian Area USSR and capital of the E Siberian Region situated some 45 m W of Lake Baikal on the Angara a tributary of the Yenisei. It is an important economic centre for the Lena and Amur mining areas and the Siberian fur and timber trades and for commerce with China especially in tea. Local industries include brewing leather manufactures and sawmills. Irkutsk suffered very severely from the fighting between Whites and Reds 1918-21. Admiral Kolchak was executed there in 1920. Pop (1926) 103,900.

Iron, a common metallic element widely distributed and found both in the native state and in combination. Iron is the fourth most abundant element in the earth's crust of which it forms 4 per cent. From the industrial point of view iron is the most important of all metals being used in the manufacture of almost all the more important man-made structures. For its metallurgy see **IRON AND STEEL**.

There are several iron ores the principal of which are the oxides from which iron is obtained by reduction with carbon. Pure iron never occurs in practice. All the iron met with in commerce contains smaller or greater quantities of carbon together with other constituents such as silicon and metals like tungsten etc (see **IRON AND STEEL**).

Apart from its engineering uses iron has considerable medicinal importance. It is an essential constituent of the diet since the hæmoglobin of the body is continually being broken down and iron is necessary for the production of fresh material. Therapeutically its principal use is in the treatment of

anæmia (qv). Externally the salts of iron are employed as astringents and hæmostatics. For internal use a large number of iron-containing preparations are used both of inorganic and organic constitution e.g. Bland's pill which contains a mixture of ferrous sulphate and sodium carbonate.

The most important iron compound is hydrated ferric oxide $^2\text{Fe}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$ which is the principal component of rust. The rusting of iron is a subject which has occupied the attentions of researchers for numerous years and even now the mechanism of rusting is by no means agreed upon. The most probable view is that for rusting to occur the presence both of water and of carbon dioxide is necessary although some workers state that rusting can occur in the absence of the latter substance.

Iron forms two series of salts the ferrous in which the metal is divalent and the ferric in which it has a valency (qv) of 3. Of the ferrous salts the most important is the sulphate FeSO_4 also known as green vitriol. It is employed in the manufacture of ink (qv) as a mordant and in chemical analysis.

The most important ferric salt is ferric chloride FeCl_3 employed in various industrial chemical reactions as an oxidising agent in medicine and as a mordant.

Iron Age a phase in the cultural evolution of man in which iron was the material used in the manufacture of implements especially those of warfare. It includes the historic period down to the present day but is usually restricted to early historic time. It immediately followed the Bronze Age (qv) but began at different times in various countries, and there are still places where the use of the metal is unknown. The knowledge of iron seems to have originated in the East. Egypt continued to use bronze for a long time after the surrounding countries had adopted iron. The earliest mention of iron was in 3400 B.C. but it did not assume

Staffordshire, Shropshire, and S. Yorkshire

Dudley's use of raw coal as a furnace fuel revolutionised the aspect of the industry. Iron smelting became intimately allied with the coal industry, and concentrated in the neighbourhood of coalfields. In 1783 Cort invented the puddling process, which overcame the lack of malleability in coal-smelted iron, and this process, together with the invention of the rolling-mill, prepared the industry to supply the huge demand for iron machinery at the beginning of the 19th cent. Coke-smelting superseded coal-smelting, and the introduction of the hot blast by Neilson in 1828 increased efficiency. Steel was available, but prohibitively expensive, until Bessemer introduced his process in 1856. There followed an enormous development in the British steel trade.

The British industry was largely built up on the Bessemer converter, but in 1866 the Siemens Brothers invented the open-hearth furnace, which began steadily to oust its predecessor, and between 1890 and 1901 increased its output from 33 per cent to 71 per cent of the total. At this time steel could only be made from iron ore of low phosphorus content, and in this respect the ores of Britain and the United States were particularly suitable. In 1880, however, the basic process of eliminating phosphorus, invented by Thomas, enabled Germany to exploit her own high-phosphorus-content ores, and enter into competition with the British industry.

The last quarter of the century witnessed a steady decline in the output of manufactured iron, which coincided with a simultaneous growth in the output of steel.

The World War enormously increased the demand for steel, and in order to cope with it, increasing quantities of basic steel had to be made from imported ores.

The following tables give the world production of iron and steel and that of the principal producers.

Pig iron (million tons)

	U.K.	U.S.A.	Germany	France	World
1870	6.9	1.7	1.2	1.2	11.0
1890	7.9	0.2	4.0	1.6	23.7
1913	10.2	31.0	16.5	5.1	77.3
1929	7.7	43.3	13.2*	10.4	85.5
1931	3.8	15.7	6.1	8.2	53.6

* Including the Saar

Steel (million tons)

	U.K.	U.S.A.	Germany	France	World
1870	0.2	—	0.1	0.1	0.5
1890	2.6	4.3	2.1	0.7	12.3
1913	7.7	31.7	17.3	4.6	75.1
1929	9.8	57.3	16.0*	9.7	122.5
1931	6.3	26.2	8.3	7.8	69.1

* Including the Saar

The British pig-iron industry is located in four major and three minor areas. The chief are Durham, where the famous Cleveland iron-stone was discovered in 1815 and which to-day supplies a third of the total output, Cumberland and NE Lancashire, working chiefly hæmatite (low-phosphorus) ore, half local and half imported, Derby, Leicester, Notts, and Northants, producing foundry iron from local ores, Scotland, using imported ores and smelting with coal. The minor areas are Staffordshire, S. Wales, Lincolnshire, and Sheffield. The steel-producing areas are Scotland (2 million tons), Durham (2), South Wales (2), Sheffield (1), Staffs, Northants, and Lincolnshire (2).

In the making of 1 ton of pig-iron, 2-3 tons of iron ore, 7-10 cwt of limestone, and 2-3 tons of coal or coke are used. The smelting is done in a blast furnace. The size of the furnace, though it varies considerably, is ultimately limited by the most economical power of the blast. Further, a blast furnace must be kept always in operation, and its speed of production cannot be altered. Works consist, therefore, not of smaller or

larger furnaces but of a greater or smaller battery of furnaces some of which will be closed down altogether when it is required to reduce output.

The organisation in steel making is much the same as in smelting and a battery of Bessemer converters or open hearth furnaces is used.

From the furnaces the steel goes to the rolling mills. A large stock of rollers is necessary and represents an important capital charge. In the best system of production the three processes—melting, converting and rolling—are carried on side by side.

The interdependence of the various stages in the iron and steel industry tends to encourage large-scale vertical combination and many important concerns have acquired coal mines in order to obtain their raw material at a steady cost and shipyards in order to be sure of a certain market for their product.

The iron and steel industry in Great Britain employs 400,000 men and has a gross output of £28 millions. The principal outlets for the finished products are building (concrete reinforcement girders etc.) railways, shipbuilding, general machinery and exports. The latter normally average 4 million tons or between one third and one-quarter of total production.

European production is controlled by the Continental Steel Cartel which regulates output and export prices while ensuring that each country shall remain free of its own home market. Each ton of steel produced in excess of quota is fined 16/- and each ton in deficit is rewarded 8/-. British producers have stood out from the Cartel on the ground that the quota offered them was too small.

Iron Cross originally a Prussian order created as a decoration for those who distinguished themselves in the Napoleonic War of 1813 whether in civil or military life. The device now comprises a Maltese Cross bordered with silver. On the upper arm is engraved a crown in the centre a bold capital W and on the lower arm

the date. The Order is divided into three classes: first, second and the Grand Cross. The latter is a decoration awarded only to the Commander at a very important victory. The two former are awarded for gallantry in the field. The Order which fell into abeyance after the Napoleonic Wars was revived in 1850 and again in 1914 when it formed the main decoration awarded to members of the German services during the World War.

Iron Mask, The Man in the a prisoner of Louis XIV whose identity was carefully concealed by his jailers. He is known to have died in the Bastille in 1703 and was buried in the parish cemetery of Saint Paul under the name of Marchioti. When being transferred from one jail to another the mysterious prisoner always wore a mask and was carefully guarded against scrutiny. The real name of the prisoner which was never disclosed gave rise to various stories.

Ironing *see* LAUNDERING

Ironsides, a nickname for those who show great endurance. It was given to Edmund II King of England to Cromwell after the battle of Marston Moor and to his troopers for their endurance and rigid discipline.

Ironstone, *see* IRON AND STEEL.

Ironwork the treatment of iron in a decorative manner.

China and Japan In China cast ironwork was used as early as the 9th cent. in constructing temples. A purely Chinese use of pierced iron was for pictures with a background of silk which showed up the delicacy of the ironwork. This fashion arose in the 17th cent. and the craft is still practised. The best known Japanese ironwork is the ornamental sword guard often inlaid with gold specimens of which are quite common in England.

Spain In the Middle Ages choir and altar screens were constructed from iron and many splendid specimens are extant notably at Burgos, Toledo and Barcelona.

France The zenith of French

ironwork was during the reign of Louis XIV, and the gates, etc., at Versailles, Chantilly, and Fontainebleau bear witness to the skill of the French smiths in this medium

England Some of the finest English ironwork was produced in Sussex, from c 1500 to 1700, when the Weald was the "Black Country." Casting was the method employed. It is said that the cannons for the *Great Harry*, the first English battleship, were cast in Sussex. The smiths of this district produced especially fire-backs and fire-dogs, and there are some very good examples in the Victoria and Albert Museum, and in the Brighton Museum.

Ornamental ironwork naturally tends to follow prevailing architectural styles, and thus it degenerated during the 19th cent., but at present there is a revival in the art of ironwork, and both in Europe and the U.S.A. work is being produced—staircases, grilles, hinges, candelabra, etc.—in which the texture of the metal itself is an integral part of the design.

Iroquois, see RED INDIANS

Irrawaddy (or *Irawadi*), the principal river of Burma, rises from two sources near the S.E. Tibetan border, and flows S. between the parallel ranges forming the peninsula of Further India, the lower stream enters the Burmese plain and reaches the sea by 9 main effluents. The Chindwin is the chief tributary. Bhamo, Mandalay, Bassein, and Rangoon are the most important towns on its banks. The river is navigable to Bhamo (c 900 m), and drains a wide area, there are no bridges. Length, c 1,400 m.

Irrigation, the provision of water for agriculture by artificial means. Of the various contrivances for raising water, there are two elementary forms which are still to be seen in great numbers on the banks of the Nile. The first is known in Arabic as the *Shadoof*, and consists of two upright posts supporting a horizontal axle, to the centre of which is

tied at right angles a long pole. Attached to one end of the pole is a bucket which dips into a narrow channel cut in the bank of the river, and to the other end is attached a balance weight. The cultivator swings the pole on its axle so that the bucket is immersed and filled with water, and then, by depressing the free end of the pole, raises the full bucket and tips the water into a channel.

The other common contrivance, the *Sagya*, consists of a large wheel with buckets attached to the rim, the wheel being turned by an arrangement of primitive pinions. Power is supplied by oxen. The wheel dips into a channel cut from the river. When each bucket is at the lowest point of its travel it fills with water, and each is emptied into a channel on reaching the highest point of the wheel.

In large schemes of irrigation water is obtained from rivers or wells. In the case of rivers a dam or barrage is constructed across the river to raise the level of the water above that of the area it is desired to irrigate. A barrage is a low dam or weir, the irrigation water flows into intake canals on the upstream side, surplus water flows over the barrage, and sluices regulate discharge. Not only does a dam raise the water level, it also impounds a large quantity of water on its upstream side which is kept as storage for use during dry months.

In most irrigation schemes the water is distributed by gravity. The main canals, taking off above the dam on either bank, follow contour lines above the area to be irrigated. From the main canals smaller channels shoot off at intervals, and these in turn supply distributories running parallel to the main stream. From these last channels the water is drawn off as desired to irrigate the fields or patches.

Irrigation is practised in many countries, notably in the U.S.A., India, Egypt, and Australia. In the

U.S.A. large areas are supplied with water from wells raised by wind power and in both Australia and the U.S.A. many artesian wells are now in use for supplying water. Irrigation in Egypt is dependent entirely upon the annual flood of the Nile. The water is regulated in Egypt by the Aswân Dam and in the Sudan by the Sennar Dam on the Blue Nile.

Irving Sir Henry (1838-1905) English actor-manager born at Keinton Mandeville Somerset his original



Sir Henry Irving

name was John Brodribb. His first stage appearance was in Lytton's *Richelieu* 1856 played Matthias in *The Bells* at the Lyceum 1871. Manager 1878-99. Haughted 1890 being the first actor to receive that honour. Ellen Terry (qv) was leading lady in most of the Lyceum productions which had a great influence on the English stage. Irving's performances as Hamlet and Shylock especially evoked unqualified admiration. His two sons **HENRY BRODRIBB IRVING** (1870-1919) and **LAURENCE SIDNEY**

BRODRIBB IRVING (1871-1914) were also distinguished actors. The former was a keen criminologist and author of *A Life of Judge Jeffreys* (1898) *A Book of Remarkable Criminals* (1918) etc. Laurence Irving was drowned in the wreck of the *Empress of Ireland*.

Irving Washington (1783-1859) American author. He travelled in Europe and described his journeys in his *Sketch Book* (1820) *Tales of a Traveller* (1824) *The Conquest of Granada* (1829) and other books of essays and tales. He is noted for his prose-style and light and charming touch.

Irwin 1st Baron Edward Frederick Lindley Wood (b 1881) son and heir of Viscount Halifax. He entered politics in 1910 as Unionist M.P. for Ripon which seat he held until 1925. During this period he held office as Parliamentary Under Secretary for the Colonies 1911-2. President of the Board of Education 1924-5 and Minister of Agriculture 1924-5. In 1926-31 he was Viceroy of India and in 1932 he was again President of the Board of Education. In 1933 he succeeded Viscount Grey as Chancellor of Oxford University.

Isaiah [1216] greatest and most important of the Old Testament prophets. Isaiah the son of Amos was married, had a family and lived in Jerusalem evidently enjoying social rank. His book is one of the most remarkable writings in the Old Testament. He describes in chapter vi the vision which made him a prophet. He prophesied from c. 740 B.C. through the reigns of Jotham, Ahaz and Hezekiah, Kings of Judah. His fame caused others to write in his name and Aben Ezra, a Jewish rabbi of the 12th cent. first suggested that the book should be subdivided. For example chapters xl-lxvi are divisible into two sections: xl-lv (known as Deutero-Isaiah) and lvi-lxvi (known as Trito-Isaiah). These are not by the prophet who is described in chap. vi, as portions are certainly post-exilic.

Isandhlwana, Battle of (Zulu War). Jan 22, 1879) An overwhelming body of Zulus under Matyana massacred a small British force under Colonel Durnford, consisting of 6 companies of the 24th Regiment, a contingent of Natal volunteers, and some Basutos.

Isère: (1) Department, S E France, between the R's Rhone and Isère. Products include cereals, vines, tobacco, and dairy produce, the main industries are glove-making, silk weaving, and cement manufacture. The chief towns are Grenoble (capital) and Vienne. Area, 3180 sq m, pop 558,000.

(2) French river rising in the W Graian Alps and flowing in a general direction W S W to the Rhône, which it joins N of Valence. Grenoble, near the confluence of the Drac, is the principal town on its banks, below this point the river is navigable. Length, c 180 m.

Isfahan [ES'FA'HAHN] (or *Isfahan*), a province of Persia. It is an important agricultural area, producing cotton, tobacco, cereals, and poppies for opium manufacture. Pop c 500,000. Isfahan, former capital of Persia and chief town of the province from the 17th cent until 1798, was the seat of the Shah's government. Pop c 100,000.

Isinglass, a gelatinous material, used for cooking, etc., obtained from the bladders of fishes. Agar-agar (*qv*) is sometimes known as Chinese isinglass. See also ADHESIVES.

Isis, one of the two chief Egyptian deities, the sister and wife of Osiris, was identified by some authorities with Io (*qv*). She was the goddess of all nature, of love, learning, fertility, agriculture, and of the moon. Her priests were bound to celibacy. Her festival, the *Isia*, was introduced into Rome, but on account of the licence that marked it, it was prohibited in 57 B C.

Islam, see MOHAMMEDANISM.

Isle de France, see MAURITIUS.

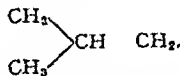
Isle of Wight, see WIGHT, ISLE OF.

Ismail Pasha (1830-1895), Khedive

of Egypt from 1867 to 1879, the second son of Mehemet Ali (*qv*). He received a European education, and returned to Egypt to succeed his brother as Vali of Egypt. On the death of his uncle Said Mohammed in 1863, he became Viceroy of Egypt after suppressing a revolt in the Sudan and was proclaimed Khedive in 1867. He took early steps to introduce foreign capital into Egypt, and within a short time the foreign debt of Egypt stood at £100 millions, although Egypt had become enriched through the phenomenal rise in the price of cotton owing to the American Civil War. The financial situation subsequently became so difficult that foreign interference was precipitated and Ismail was compelled to abdicate in 1879. He passed the rest of his life in exile.

Isobares (to be distinguished from isobars, a meteorological term), term used in chemistry to denote substances which, although occupying different positions in the periodic table and having different chemical properties, possess the same atomic weight. Isobares occur only as a result of radioactive changes, and they may be considered to be the converse of isotopes (*qv*). See also RADIOACTIVITY.

Iso-compounds. The prefix "iso" in organic chemistry denotes a compound which is structurally different from the parent compound and is isomeric with it, having a difference in the position of one or more of the groups or a molecular rearrangement which suffices to make it a distinct entity. For example, taking the case of the hydrocarbon butane (*qv*), we may have either normal butane represented by the formula $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$, or the same atoms arranged, with some modification, to give *iso*-butane



The prefix *iso* is ignored in heading in this encyclopædia, and the various "iso" modifications are described

under the heading of the normal compound *e.g.* for iso amyl alcohol see under AMYL ALCOHOL.

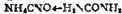
Isocrates (436-338 B.C.) Greek orator of whose speeches 21 are extant. He had a school at Athens and was a friend of Philip of Macedon. He is said to have committed suicide when Philip defeated the Athenians at Chæronea.

Iso-Electric Point, a term employed in the chemistry of the proteins to indicate the degree of hydrogen ion concentration (*pH*) where the number of cations in solution is equal to the number of anions. This condition applies in certain circumstances to the case of ampholytes that is a substance which dissociates in solution both as an acid and as a base a class of substance to which the soluble proteins belong. The iso-electric point for each protein is characteristic of that protein. The iso-electric point represents the optimum conditions for the coagulation of proteins by heat owing to the fact that the electric charges on the colloidal particles which hinder agglomeration are at a minimum.

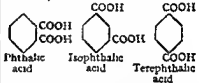
Isomerism, name given where two entirely different chemical individuals have the same empirical formula and the same molecular weight.

Isomerism is uncommon in inorganic compounds although some instances are known such as the two different hexahydrates of chromium chloride and of nickel sulphate. The similar forms of elements known as allotropes (see ALLOTROPY) are not in all cases isomers owing to the fact that in the majority of instances there is a difference in a molecular weight. In organic compounds there are an enormous number of isomers possible. The isomerism of organic compounds has received a great deal of study and can be divided into several classes. One of the earliest examples of isomerism noted was that which may be said to have commenced modern organic chemistry the production of urea by

the molecular rearrangement of ammonium cyanate according to the following scheme



This is a typical example of structural isomerism. Another example is ethyl alcohol and methyl ether both represented by the formula C_2H_6O . As a subdivision of structural isomerism may be cited position isomerism in which the fundamental carbon nucleus is the same but there is a difference in the position of substituent groups. The clearest examples are in the benzene derivatives as in the case of the phthalic acids where either of the three following cases may occur



The expression tautomerism or dynamic isomerism is used in organic chemistry to explain the behaviour of certain compounds which whilst existing in one form only react as if they possessed either of two structural formulae. An example of a tautomeric compound is acetoacetic ester (*qv*) which can exist in the keto or enol forms as shown by the following formulae



In this as in the majority of tautomeric phenomena the change is caused by the wandering of a hydrogen atom.

An important type of isomerism is stereoisomerism or spatial isomerism in which the difference between two compounds is due to the difference of the position of certain groups in space. Such compounds are nearly always characterised by optical activity and they can occur in dextro-rotary, levo-rotary and inactive forms. The latter may be

racemic, that is, a mixture of equal amounts of the *d*- and *l*-compounds, or else an internally compensated compound in which the optical inactivity is due to the structure of the individual molecules. See also STEREOCHEMISTRY AND CHEMISTRY

Isomorphism, is the phenomenon of two or more substances of analogous chemical constitution crystallising in a similar form, from this we are led to the converse which is sometimes known as the law of isomorphism, namely, "Substances which are similar in crystalline form and in chemical properties can usually be represented by similar formulæ." This statement was first put forward in 1819 by Mitscherlich (*qv*). The isomorphism of substances shows itself in their appearance, the dimensions of the crystal angles, in the inner structure of the crystals, in their heat conductivity, in their coefficients of thermal expansion, and in some of their optical properties. Cases of isomorphism are known amongst representatives of all the crystal systems. There are a few minor anomalies.

Isoprene, β -methyl-butadiene or β -methyl-divinyl, $\text{H}_2\text{C}=\text{CH}-\text{C}(\text{CH}_3)=\text{CH}_2$,



a colourless liquid hydrocarbon of the diolefine series. It has a boiling-point of 37°C . Isoprene is of considerable theoretical and practical importance, since it is obtained by the distillation of rubber, and it is a starting material in the manufacture of synthetic rubber. A commercial method for the manufacture of isoprene has as its starting-point *iso*-amyl alcohol, obtained from fusel oil (*qv*). Rubber has the same empirical formula as isoprene, i.e. C_5H_8 , the molecular weight is, however, probably c. 100 times as great. See also RUBBER.

Isotherms, lines on a map joining places which have the same mean annual or monthly temperature, first used by Alexander Humboldt (*qv*).

Isotopes may be defined as elements which have different atomic weights

but identical chemical properties. The first instances of isotopes were found by Soddy among the radioactive elements, when it was discovered that several substances which were clearly distinguishable by their radioactive constants were incapable of differentiation by chemical methods. Thus two or more elements which occupy the same place in the periodic table, and which are chemically inseparable and identical, are said to be isotopes of one another. At first the phenomenon of isotopy was thought to be confined to the radioactive elements, but the work of Aston with the mass-spectrograph, an apparatus for the analysis of positive rays (*qv*), has shown that the large majority of elements, instead of being a simple substance, as previously thought, are in fact mixtures of isotopes.

The accuracy of the mass-spectrograph is of the order of 1 in 1000. Thus, if an isotope is present only to the extent of $\frac{1}{100}$ per cent it can be detected by this method. For the detection of isotopes present in smaller quantities a method is utilised which depends upon the examination of the band spectra yielded by the element under examination.

The first non-radioactive material in which the presence of isotopes was demonstrated was neon, which was examined in 1912, and found to consist of a mixture of Ne^{20} and Ne^{22} . Since then a large number of elements have been examined, and many of them have been found to be complex elements (that is, composed of a mixture of isotopes). The following elements have been found to be mixtures of isotopes (the figures in brackets indicate the number of isotopes so far discovered, the elements are placed in order of increasing atomic number):

Lithium (2), boron (2), carbon (2), nitrogen (2), oxygen (3), neon (2), magnesium (3), silicon (3), sulphur (3), chlorine (2), argon (2), potassium (2), calcium (2), chromium (4), iron (2), nickel (2), copper (2), zinc (7), gallium (2), germanium (8), selenium (6),

bromine (2) krypton (6) rubidium (2) strontium (3) zirconium (4) molybdenum (7) silver () cadmium (6) tin (11) antimony (7) tellurium (3) xenon (9) barium (4) cerium (7) neodymium (4) rhenium () mercury (7) thallium (4) lead (8) bismuth (5) polonium (7) radon (3) radium (4) actinium () thorium (6) protactinium (2) uranium (3) The last ten elements in the above list are those in which the occurrence of isotopes can be explained by radioactive changes.

If the atomic weights of the above simple elements are examined it will be found that they are all whole numbers or extremely close to whole numbers just as the atomic weights of the isotopes of complex elements are whole numbers. This fact is strong evidence in favour of the modern view that all elements are built up from hydrogen nuclei.

Ever since isotopes were discovered the problem of their separation has been studied. The first attempts were made with neon and some slight success was obtained by the fractional diffusion of the gas through porous material. By this method neon of densities 20.15 and 20.8 ($O = 3$) was prepared.

Various other methods for the separation of isotopes have been tried such as thermal diffusion, fractional distillation and evaporation under low pressure. Of these only the latter has shown any measure of success: a marked separation of mercury chloride and zinc into light and heavy fractions having been accomplished by this method.

Although it has been stated above that hydrogen is one of the simple elements not composed of isotopes, recent work has afforded evidence of the possibility of the existence of H^3 . In the case of hydrogen the separation of the isotopes is possible by electrolysis of water containing dilute acid. It has been possible to prepare water containing the H^3 isotope and having a density 10 per cent greater than ordinary water. See also Iso-

BARES CONDUCTION OF ELECTRICITY THROUGH GASES

Isfahan, see ISFAHAN

Israel see JEWS

Israel's Josef (1824-1911) Dutch painter of Jewish origin. After studying in Paris he settled at The Hague. His genius lent itself particularly to the portrayal of the tragedy of the poor for whom he had an intense sympathy. He travelled extensively in Spain and wrote a book upon his experiences. His chief works are *Villa a Poor*, *The Widower*, *The Bric à brac Seller*, *Between the Fields and the Seashore* and *When we Grow Old*. The Tate Gallery has *The Philosopher* and *The Shipwrecked Mariner*.

Issus Battle of (Cilicia) (333 B.C.) the Persian army (said to number 600,000) under Darius was routed by Alexander the Great with 3,000 Macedonians. The former is said to have lost 100,000 men in the battle and pursuit.

Istanbul, see CONSTANTINOPLE

Isthmian Games, ancient Greek sports so named from the Isthmus of Corinth at which town they were held. They were first instituted in 1326 B.C. and were later reinstituted by Theseus and held every 5 years.

Istria, a large mountainous peninsula at the N.E. angle of the Adriatic Sea, now comprising the Italian province of Pola in Venezia Giulia. Timber, bauxite, sea salt and olive oil are important productions. Vines, cereals, olives and melons are grown and cattle bred in large numbers. It was formerly a margravate of the Austrian duchy of Carinthia. It fell later to the Venetian Republic which retained the district till 1797. After several changes Austria regained control and retained it till the end of the World War. Area 1536 sq. m. pop. (1931) 29,500.

Italian Language, The, one of the more important of the Romance languages (99). Vernacular Latin did not develop uniformly throughout the whole of the Italian peninsula and there remain a great number of dialects

differing from one another in varying degrees, all of which have, in theory, an equal claim to be considered the Italian language. It is very largely owing to the fact that the great writers in the language, Dante and Petrarch and Boccaccio, used the Florentine or Tuscan dialect that this has become the standard language of literature and educated speech, and as such it has changed very little since the time of Dante. The general grammatical features are those which characterise all the Romance languages. It has retained a remarkable purity of vowel sounds, and is therefore excellently adapted to singing. It has, moreover, the advantage of being one of the most "phonetically" spelt of European languages. The following are the main features of its spelling: *c* and *g* before *a*, *o*, or *u* are pronounced *k* and *g*, and before *e* and *i* *ch* and *j* respectively, *ch* and *gh* before *e* and *i*

are pronounced *k* and *g* respectively. *qu* and *gu* are *kw* and *gw*; *j* is *y*; each element in a diphthong, as in *au*, is distinctly pronounced, double consonants are double in fact as well as in name.

Italian Literature It was not until the 13th cent. that the Tuscan dialect really established itself as the literary language of Italy, and consequently there is little or no literature, apart from Latin, before that time. As usual, poetry was quicker to develop than prose, and there was a "Sicilian School" of poets centred round the Court of Frederick II of Sicily, who reigned from 1220 to 1250. Soon after Frederick's death Sicily was severed from Italy, and the literary centre shifted to Tuscany, where the first notable landmark is the poem on the battle of Montaperti by Guittone d'Arezzo (d. 1294), the first of those *canzoni* on current events which are a



Waiting, by Josef Israels.

salient characteristic of Italian poetry. From this beginning arose the immediate predecessors of Dante in what he called the sweet new style. Thus Dante Alighieri (1265-1321) found much of the pioneer work in the development of poetry already accomplished (see DANTE ALIGHIERI for details of his life and work).

Francesco Petrarca (1304-1374) better known in English as Petrarch (q.v.) brought the sonnet (q.v.) to perfection. He was the second of the great Tuscan triumvirate of which Dante and Boccaccio were the others. All the glory of classical Latin literature lived in him together with a burning enthusiasm for the present and future of Italian literature. This is largely true also of his friend Giovanni Boccaccio (q.v.). Both as poet and as story teller Boccaccio's influence upon European literature is enormous. In poetry the *Filosofo* and *Teseide* were the direct sources of Chaucer's *Troilus and Criseyde* and *Knights Tale* and they established the use of ottava rima (q.v.) for narrative and romantic poems in Italian. But he is more famed for the *Decameron* which apart from its wide influence marked a very great step in the development of Italian prose.

The 14th cent. is remarkable also for a number of historians such as Giovanni and Matteo Villani and for a series of religious works among which the *Fioretti di San Francesco* (The Little Flowers of St. Francis) is the most widely known.

The Renaissance with its revival of classical learning resulted in a great diminution in the quantity of vernacular Italian literature during the first part of the Quattrocento (15th cent.) and the most notable figure during these years was Leon Battista Alberti (1404-1472) who modelled his dialogues upon Cicero. But later in the century particularly in Florence, Ferrara and Naples there was a great revival of Italian. In Florence associated with Marsilio Ficino (1433-1499) there was a tremendous interest in

Neo-Platonic mysticism with its cult of supreme beauty to which Spenser and Shelley are notable debtors. In English poetry also flourished under the auspices of Lorenzo de' Medici (q.v.) who himself no inconsiderable poet was the patron of Politian (Angelo Poliziano 1454-1494) a scholarly poet who happily united the classical and the modern styles in his work.

About the beginning of the 16th cent. a great impetus was given to the development of Italian prose by Leonardo da Vinci (q.v.) and to literature in general by Pietro Bembo (1470-1547). The latter of these did much to stabilise the Tuscan dialect as the standard literary language of Italy. The prose of the first half of the century is best represented in the work of Machiavelli, Castiglione and Guicciardini. The style of Machiavelli (q.v.) is lucid and direct unmarred by artificial ornamentation and has probably had a great influence upon Italian prose style.

The supreme poetic achievement of this period was the *Orlando Furioso* of Ariosto (q.v.) but it is notable also for the beginnings of Blank Verse (q.v.) in the work of Trissino (q.v.) and Rucellai (q.v.).

Letters and Biography take a prominent place in Cinquecento literature best known among them are the work of Pietro Aretino (q.v.) and Benvenuto Cellini (q.v.) the *Life* of the latter being one of the most vitally significant books of the century. The *Novelle* (1554) of Matteo Bandello are chiefly of interest to the English reader as being the source of *Romeo and Juliet* of an episode in *Much Ado About Nothing* and of Webster's *Duchess of Malfi* while *Masura for Measure* and *Othello* are derived from the *Ecce Homo* of Giovanni Battista Giraldi Cinthio (1504-73).

In the field of drama the 16th-cent. comedy was modelled upon that of Plautus and Terence and is best represented by the *Mandragora* of Machiavelli and some of the comedies

of Ariosto and Ariosto. It would not be easy to single out one tragedy that merits a place in the dramatic literature of the world.

The 17th cent., together with the close of the 16th cent., is known as the *Secentismo*. It is a period of artificiality and falsity in all the higher forms of art, coinciding with the oppressive influence of the Spanish domination and the Inquisition. The exaggerated striving after effect typical of the art of this period is reflected in the poetry of Giovan Battista Marino (1609-1625), whose mannerisms infected subsequent poetry right up to the closing years of the century, though an exception may be made of the satires of Salvatore Rosa, the painter, and Alessandro Tassoni.

But the unfortunate characteristics of the *Secentismo* did not appear in the prose of the great thinkers of the period. Such men as Galileo Galilei, Tommaso Campanella, and Giordano Bruno, though not belonging primarily to literature, produced clear and virile prose which is in sharp contrast with the contemporary poetry.

The reaction against Marinism came with Francesco Redi's *Baccho in Toscana* (1685), a dithyrambic poem in praise of Tuscan wine. He and Vincenzo da Filicaja and Alessandro Guidi were prominent members of the *Arcadia*, a famous Academy founded in 1690 at Rome for the purpose of bringing literature back to the simpler fields of pastoral antiquity.

The influence of the *Arcadia* upon Italian poetry is evident right up to the time of the French Revolution, and the salient poet of this school was Metastasio (1698-1782) who, apart from his poetry, had considerable merit as a dramatist. A later product of this school, but rising superior to its limitations, was Giuseppe Parini (1729-1799). But the 18th cent. is less remarkable for its poetry than for the criticism of Lodovico Antonio Muratori (1672-1750), the historical and philosophical science of Giovanni Battista Vico (1668-1744), and the

famous work on criminal legislation, the *Dei delitti e delle pene* (1764) of Pietro Verri.

Comedy was modernised by Goldoni (1707-1793) and romanticised by Gozzi (1720-1806), many of the former's best being written in the Venetian dialect, and in Vittorio Alfieri (1749-1803) Italy found her first tragic dramatist of any note.

The political ideals of the French Revolution found ready acceptance in Italy, where their effect upon literature was a revival of contact with the classical Greek and Latin writers. This tendency was already apparent in the work of Alfieri, but was more fully expressed by Ugo Foscolo (1778-1827), whose blank verse *I Sepolcri* is one of the greatest Italian poems. This was also the period of Italian romanticism, the greatest representative of which was Alessandro Manzoni (1785-1873), now chiefly known for his prose romance, *I Promessi Sposi*, but a greater poet, in some respects a romantic but actually outside such classification, was Giacomo Leopardi (1798-1837).

Political events have a dominating influence over Italian literature from the 3rd decade of the 19th cent. The *Risorgimento*, the patriotic fervour for a re-born and unified Italy, and later for the recovery of *Italia Irredenta*, colours nearly all the poetry and prose. The outstanding name is Giosuè Carducci (1836-1907), who gave to his political and anti-religious ideals a truly artistic expression in both media.

After the unification of Italy a prominent feature of Italian literature was the realistic novel, of which Verga's *I Malavoglia* (1881) and Fogazzaro's *Piccolo Mondo Antico* (1896) may be called the greatest. In poetry the great names, other than Carducci, in modern Italian literature are Giovanni Pascoli (1855-1912) and Gabriele D'Annunzio (*qv*). Among modern philosophical and critical writers Giovanni Gentile and Benedetto Croce are prominent.

An excellent general work to consult is C Foligno's *Epochs of Italian Literature* (Clarendon Press) and there are abundant English translations of all the great Italian authors.

Italian Somaliland, see SOMALILAND ITALIAN

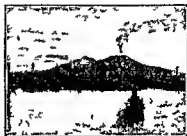
Italic Languages a group of Indo-European languages which includes Latin Oscan and Umbrian and probably many more dialects of which no record is extant

Italy (*Italia* Fr *Italie* Ger *Italian*) State of S Europe a 700-mile peninsula extending S E from Switzerland and Austria bounded W by the Ligurian and Tyrrhenian Seas S by the Ionian Sea and the Strait of Messina which separates it from Sicily and E by the Adriatic. The large islands of Sicily and Sardinia (qq v) and several smaller ones along the coast including Elba are Italian. The S extremity is in the shape of a shoe the hollow being formed by the gulf of Taranto. The W coast is freely indented and provides a number of fine harbours including Genoa Leghorn Naples and Salerno. Area 119 45 sq m pop 41 808 000

Relief In the N the Alps extend W-E across the widest part of the country and the other great range the Apennines stretches across the plains of Piedmont Lombardy and Venezia through which flows the R Po. In the extreme NW the Ligurian Alps and the Apennines join. The Apennines stretch the entire length of the peninsula varying greatly in height being highest in the centre and S. Both coastal areas are plains. The volcanic region extends from Mt Amiata (5 00 ft) in Tuscany to Vesuvius (c 4000 ft) in Campania the latter having been in a state of constant eruption since AD 79. Chief rivers are the Po the Arno flowing to the Gulf of Genoa and the Tiber flowing W. Many short streams run from either side of the Apennines. Greatest lakes are Garda a favourite testing place for high speed aircraft Bolsena Trasimeno and Bracciano.

The most beautiful lake is Como Maggiore (the greatest) lies between Italy and Switzerland.

Climate This varies greatly owing to the direction of the mountain ranges and the length of the peninsula. The N has cool winters and hot summers the centre and S are among the hottest parts of Europe all the year except in the mountains. Rainfall is generally good and large areas over the whole country are agricultural. Parts of the S are malaria fever districts but are being improved. The most notable native plant is the olive. Animals are not numerous they include wolves and boars. There



View from the Bay of Naples

are several varieties of snake and many birds.

Agriculture Italy's important agricultural areas are being extended by modern methods. Chief crops are cereals grapes olives vegetables rice fruit and sugar beet. Smaller but valuable are tobacco hemp and silk. Live stock is reared widely especially sheep and cattle. A great increase has occurred in the output of wheat and Italy now supplies more than one-third of her demand. Fruit is exported largely especially lemons and oranges. Commercial orchards are being established and scientific methods of production and marketing introduced. It is estimated that the annual value of all agricultural produce with timber is c £110 millions.

Minerals Italy suffers considerably from lack of coal but she is fairly

well provided with other minerals—iron, lead, sulphur, marble, zinc, manganese, and copper

Industry The leading industry is cotton, which employs c 650,000 hands. Silks are important, especially in Lombardy, Venezia, and Piedmont. Sugar refining is growing rapidly. Many of the factories are small, but State aid is given to developing industries. Engineering especially is encouraged, and has produced excellent aircraft, as well as several celebrated makes of racing motor-cars. The shipping and electrical industries, too, are being fostered, in 1933 the Italian liner *Rex* broke the



Photo 1 nit

Porto S. Sebastiano, Rome

trans-Atlantic record from Gibraltar to New York. Wine and olive-oil are staple exports, both supplying large European markets. Chemicals, artificial silk, clothing, and fruit and vegetable canning are of importance. The growth of industry has led to tariff protection and a decline in agricultural exports due to retaliation, but the growth of the population has enlarged the home market. A great income is derived annually from the tourist traffic attracted by the natural beauties and Italy's great artistic and historical associations.

Towns Rome, the capital, is largest, followed by Milan, Padua, Turin, Venice, Naples, Florence, and Bologna.

Religion, Education, and Culture

Historically and (since the concordat of 1929) politically Roman Catholicism is the State religion, and ecclesiastical officials are submitted for the political approval of the Government. Other creeds are tolerated, and civil marriages recognised. Elementary education up to the age of 14 is free and compulsory. There is good provision for secondary, technical, and higher education, and the art and music schools are world-famous. There are c 30 universities, including those of Rome, Florence, Bologna, Naples, Padua, and Milan.

Government Administered by the King and two Houses—the Senate, and the Chamber of Deputies. Since the Fascists took control in 1921, the Fascist Grand Council, led by Signor Mussolini, has selected candidates who may stand for the lower house, has approved the statutes, and is the chief advisory body on all constitutional matters. The lower house of 400 members is elected by manhood suffrage, the upper consists of the Royal princes above 21 years of age, and members nominated by the King, the average total being c. 360. The Cabinet is responsible to the King, and to the head of the Government, who is also Chief of the National Council of Corporations, representing the important industrial, agricultural, transport, and commercial bodies. Each province has its prefect, who approves members of the local councils and the mayors, and is himself responsible to the King.

Transport Railways and roads are well established except in the most remote districts, and Italy has made great advances in civil aviation. There are special high-speed motor roads ('autostrada'). Post and telegraph services and wireless are highly developed.

History. Italy had little political unity from the fall of Rome until the 19th cent. In 476 Odoacer overthrew the last Emperor of the West, and became practically an inde-

pendent king although acknowledging the suzerainty of the Byzantine Emperor. In 493 he was overthrown by Theodoric King of the Ostrogoths who appeared likely to build up a stable kingdom in Italy on a combination of Teutonic and Roman principles. The Italians remained hostile however and later rulers lacked the ability to build a lasting State. The Byzantine emperors gained control in 539 but their administration was not a success in Italy. In 568 the Lombards came down from the N but were too few to colonise the country. They centred around the valley of the Po and two disconnected duchies in the S: Spoleto and Benevento. The Byzantine exarch held his ground in the N.E. the extreme S was never occupied by the Lombards. The Papacy preserved a small State in central Italy and Venice remained independent. Italy was already in chronic disunion.

After 800 the history of Italy was profoundly influenced by the fortunes of the medieval Empire (see HOLY

towns followed their armed forces defeating Frederick Barbarossa at Legnano in 1176. When the Hohenstaufen emperors were overthrown however the towns warred upon each other and factions within them ranging either with the Guelph (Papal) or



Memorial Victor Emmanuel del Reom

Ghibelline (Imperial) party disturbed the peace. The warring communities gradually coalesced into five principal States: the Duchy of Milan, the republics of Venice and Florence, the kingdom of Naples, and the Papal States.

In this restless atmosphere the remarkable intellectual revival known as the Renaissance (qv) grew up. Nevertheless national unity was not achieved. Italy fell a prey to the French invasion of 1493 and later to that of Spain. The Republic of Venice alone survived. Spain's viceroys at Milan and Naples were the real governors of Italy, though some States still had their native rulers (e.g. Tuscany, the Papal States, Modena, Ferrara etc.) but Spain was the real ruler. At the end of the war of the Spanish Succession Austrian influence replaced Spanish in N Italy. After 1797 the French republicans attacked and set up a series of democratic republics: the Cisalpine and other republics being thus constituted. Venice was Austrian but after the campaign of Marengo (1800) Napoleon was practically master and in 1805 assumed the crown of the Lombards and set about incorporating Italy in his scheme of imperialist government. He took Naples and



A Tributary of the Grand Canal Venice.

ROMAN EMPIRE) The weakness of Imperial government permitted the unfettered growth of the towns, largely as commercial links between East and West. Their wealth gave them autonomy. Venice had long been independent, then Milan and other N Italian

(1809) seized the Papal States. The French system of law and administration was introduced. Napoleon's arrogance awoke resentment and a sense of common nationality. The treaty of Vienna (1815) restored the Austrians in N Italy and the incompetent Bourbons in Naples and the Sicilies. But the Italian national movement had acquired strength and leadership in the kings of Savoy or Piedmont, the strongest native power in Italy. In 1821 Charles Albert, Prince of Piedmont, openly espoused the popular cause prematurely, and he was easily defeated. So, too, was Mazzini in 1848. The diplomacy of Cavour, minister to Victor Emmanuel, united the forces favouring a common State and secured the support of Napoleon III of France. In the war of 1859 Austria was defeated, retaining Venice, but delivering Lombardy, Tuscany, Parma, Modena, and Romagna were annexed to Italy, but France claimed Nice and Transalpine Savoy. Meanwhile, Garibaldi had conquered Sicily and entered Naples, driving out the Bourbon dynasty. On Oct 1, 1860, Garibaldi won a conclusive victory at Voltorno, and a few days later Victor Emmanuel was acclaimed king of United Italy. Venice joined Italy after the Austro-Prussian War (1866). In 1870 complete unity came with the occupation by Victor Emmanuel of the Papal States and the Eternal City. The new Italy was hampered by financial difficulties and internal strife. Nevertheless, she continued to develop her resources, to reorganise the army, and build a navy. First efforts at colonisation ended in disaster in Abyssinia (1887-97), but colonies have been established in Eritrea and Italian Somaliland, and dependent territories in Cyrenaica and Tripolitania.

Italy participated in the World War, and recovered from Austria her lost provinces at the head of the Adriatic by the peace treaties. A revolution in Italian politics followed the War. Italy had been troubled for some time

by economic strife, the strain of War made the problem acute, the country seemed on the verge of social revolution. In 1922 the fascists gained control of the government by a *coup d'état*. The framework of constitutional monarchy has been preserved, but the real power rests with Signor Mussolini and the Fascist organisation (see FASCISM).

Ithaca, one of the Ionian Islands lying off the W coast of Greece, famous for its association with *Odyssey*. Odysseus was King of Ithaca according to the Homeric epic, in which there is a vivid description of its topography. Archaeologists have failed to reconcile the Homeric description with modern geography, and it is possible that the poetic description is purely imaginary. The German archaeologist Dorpfeld has identified the Homeric Ithaca with the island of Levkas. Samuel Butler suggested that it was one of the Ægean Islands off the coast of Sicily.

Ivan IV ("Ivan the Terrible" 1530-1584), Tsar of Muscovy. He was crowned first Tsar in 1547. Victorious at Kazan (1552) and Astrakhan (1556), he drove back the Tartars, and began the advance of Russia. He began a Westernising policy usually associated with Peter the Great. In later years he became mad, and attacked his own towns, destroying Novgorod on the unproven charge of treason against its leaders.

Iveagh, Edward Cecil Guinness, Baron (1847-1927), was one of the proprietors of the famous Dublin brewery. He was elected High Sheriff of Dublin in 1876, and raised to peerage in 1891. By his will Wood, Hampstead, and the attached Mansion (now a museum) were given to the nation.

The 2nd Lord Iveagh (Edward Cecil Guinness, b 1874) was a Conservative M.P. for many years. He was Chancellor of Dublin University since 1927.

Iviza, see BALEARIC ISLES

Ivory, the name given to a variety

of dentine forming the substance of which the tusks of elephants are composed the name is sometimes extended to include the tusks of hippopotamuses walrus and narwhals (*qqv*) The best ivory is obtained from the tusks of the African elephant which are whiter and of greater density than those of the Indian species though a certain amount of ivory is obtained from India Ceylon and Burma On account of its texture and durability and the ease with which it can be polished and carved ivory has for long been a favourite substance for the manufacture of ornaments knife handles billiard balls etc

Ivory Black, a very high grade animal charcoal made from the best quality of bones and more rarely from ivory (whence the name) It is used in the manufacture of black pigments and for decolorising solutions. *See also BONE PRODUCTS CARBON TECHNICAL FORMS OF CONSULT T Lambert Bone Products and Manures* (London 1906)

Ivory Coast (*Fr Côte d'Ivoire*) French colony on the W coast of Africa between Liberia and Gold Coast Colony The French occupied the district during the 19th cent but its economic resources are still undeveloped Cocoa and cotton production are being stimulated The forests are important and some gold is found near the coast Palm kernels palm oil cacao coffee

mahogany and other woods and cotton are the chief exports Abidjan in the interior is to be the future capital The present seat of government is at Bingerville Chief ports are Sassandra and Grand Bassam The population with the exception of some 2000 Europeans is wholly Negroid Area c 120 000 sq m pop (1931) c 1 865 800

Ivory Implements *see STONE AGE*

Ivry Battle of (Wars of the Huguenots March 14 1590) the Huguenots under Henri IV gained a complete victory over the Catholic Leaguers under the Duc de Mayenne

Ivy evergreen woody climber or trailer which can climb by means of small adventitious roots to a great height over rocks trees or buildings The leaves are leathery and shiny the lower ones more or less deeply lobed the upper ones more rounded The flowers are greenish yellow borne in globular umbels on bushy branches springing from the climbing stem and the berries are black

Ixion (Iakson) in Greek mythology a king of Thessaly who invited his father in law Democoon to his wedding feast and there murdered him by casting him into a fire For this he was deserted by his friend but Jupiter carried him up to heaven There Ixion attempted to do violence to Juno and Jupiter banished him to the under world where he was tied to a wheel that revolved eternally

Jabalpur

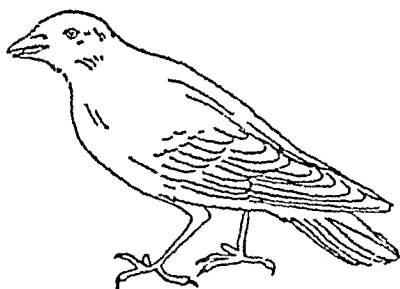
Jabalpur, *see* JUMBLPORE

Jaborandi, a Brazilian and Paraguayan shrub (*Pilocarpus pumilaefolius*) from which a drug is produced, inducing copious flow of saliva and sweat.

Jackal, name for several species of small wild dogs, like diminutive wolves, found in Africa, S Asia, and S E Europe. The Asiatic species is a useful scavenger in India, but will steal any food it can find, and preys upon small animals of all kinds. The handsomest species is the black-backed jackal of Africa.

Jackass, Laughing, *see* LAUGHING JACKASS

Jackdaw, apart from the rook the commonest species of the crow tribe in England. Like the rook, the jackdaw is gregarious, but it nests usually



Jackdaw

on cliffs, often in disused rabbit-holes. It is smaller than the rook and crow, and has some grey on the head.

Jack-o'-Lantern, *see* WILL-O'-THE-WISP

Jackson, Andrew (1767-1845), 7th President of the U.S.A., born in N Carolina, of Irish immigrant parents. He fought in the War of Independence at the age of 12, was wounded and taken prisoner by an English officer.

J

Jack

He later went to Tennessee, became storekeeper, Public Prosecutor, judge and eventually Congressman. He led a punitive expedition against the Indians in 1812, and was made major general of the army in the S. In 1818 he defeated British troops, who had landed mistakenly after a treaty of peace had been signed. This engagement earned him the nickname "Old Hickory." In 1818 he defeated the raving Seminole Indians, and followed them into Spanish Florida capturing an important Spanish town. As an indirect result, the Spanish sold Florida to the U.S.A., and Jackson was made first Governor.

In 1823 he entered the Senate representing Tennessee. In 1829 became President with an enormous popular vote. He was soon faced with the division of interests which he successfully surmounted, but which later developed into the Civil War.

He was re-elected in 1832, and his second term set his energy towards breaking the evil influence of the United States Bank, whose charter he rescinded. He is regarded as one of the greatest heroes of the Democratic Party, and as the American ideal of a self-made man.

Jackson, Sir Barry Vincent (b. 1871) founder of the Birmingham Repertory Theatre (1913), where he has produced many original plays. Since 1929 he has been responsible for the Malvern Festival, and is one of the outstanding producers of Shaw plays, and the first manager to produce *Back to Methuselah*. Among his most famous productions at London theatres have been *The Immortal Hour*, *The Farmer's Wife*, *Hamlet*, *Macbeth*, and *Romeo and Juliet*, also *The Apple Cart*, *I Am Not a Saint*, *True to be Good*, *Evensong*, and *The*

Barrells of Wimpole Street He was knighted in 1975

Jackson, Sir Francis Stanley (b 18 0) English administrator and cricketer educated at Harrow and Cambridge Financial Secretary to War Office (19-3) chairman of the Tory Party (19.3-6) Governor of Bengal (19 7-34) captain of Harrow and Cambridge Ais played for Yorkshire 1890-1906 and for England v Australia in 1893 1896 1899 1902 and 1905

Jackson, Frederick George (b 1860) explorer born at Leamington and educated at Edinburgh In 1893 he made a mid winter sledge journey of 3900 m over the great Tundra of Siberia and he led the Jackson Harnsworth expedition to Franz Josef Land where he was engaged in investigation for 3 years (1894-7) He also travelled over the Australian deserts

Jackson, John (*Gentleman Jack* son) (1769-1845) English pugilist became champion in 1793 by beating Daniel Mendoza. He only fought 3 times but did much to make boxing fashionable by his Academy in Bond Street where Lord Byron was among his pupils

Jackson, Thomas Jonathan (*Stone wall*) (18 4-1863) general in the Confederate Army in the American Civil War He served in the United States artillery during the Mexican War and later became a professor at the Virginia Military Institute His defence at Bull Run (1861) earned him his nickname he died of wounds received at Chancellorsville

Jacob Hebrew patriarch son of Isaac and Rebekah and the father of 12 sons who founded the Twelve Tribes of Israel Jacob and his brother Esau gave their names to the Israelites and the Edomites The Biblical account says that he died in Egypt at the age of 147

Jacobean Style: (1) In architecture an early 17th-cent development of Elizabethan style (q v) characterised by the transition from late Tudor to early Renaissance. Much of the work attributed to John Thorpe including

Holland House Kensington and Audley End Essex belong to this category The classical detail introduced into the houses is somewhat distorted the proportions of the columns pilasters mouldings and friezes are often in correct but the general effect remains pleasing A purer classical style was imported from Italy by Inigo Jones (1573-163) (2) In furniture the term includes early Stuart Cromwellian and Restoration (see *TURNING*) Most of the furniture was made of oak though walnut was occasionally used The term is also sometimes applied to modern machine made goods which bear a superficial resemblance to the products of this period

Jacobins (*France*) the members of a club of French revolutionists organised in 1793 as the Society of Friends of the Constitution Robespierre became its leader and it was suppressed in Nov 1 94

Jacobites (*Great Britain*) supporters of the House of Stuart after their expulsion from Great Britain in 1688 Rebelled in Scotland under the Old Pretender (q v) in 1715 and again under the Young Pretender (see *CHARLES EDWARD STUART*) in 1745

Jacobs, William Wymark (b 1863) English humorist His works are mainly concerned with the humours of sailors and ships They include numerous short stories *Many Cargoes* (1896) *Light Freights* (1901) *Odd Craft* (1903) and *Night Watches* (1914) also several novels e.g. *At Sunnyside Port* (1904) and *Dialstone Lane* (1904) His short story *The Monkey's Paw* has been produced as a one act melodrama and as a film

Jacquard, Joseph Marie (1752-1834) French inventor born at Lyons After fighting both for and against the Convention troops in 1793 he worked in a Lyons factory and developed an improved loom which he exhibited in the 1801 Paris Industrial Exhibition Two years later he was attached to the Conservatoire des Arts et Métiers, where he continued to improve his machine which proved extremely suc

cessful He was pensioned, and the loom declared public property in 1806 Six years later 11,000 were in use in France

Jacquerie, French peasants' rising which took place in 1358 The cause of the revolt was oppression on the part of feudal lords The rising was ruthlessly put down

Jactitation of Marriage, in law, when one person falsely gives out that he or she is married to the other, whereby a common reputation of their matrimony may ensue The offence is a rare one, the Divorce Court has power to decree perpetual silence against the jactitation

Jade, (or *jadeste*) is a silicate of calcium and magnesium, of which two varieties are known, white and green respectively It is one of the toughest of minerals, and for this reason, and



Tree carved from Jade

on account of its colour, has always been much prized It can be so cut that it will emit a prolonged musical note when struck, and has been used for the manufacture of bells, etc It is especially valued in China, and is worked in Burma, New Zealand, and Alaska See also GEM

Jaen: (1) A province in S Spain, bordered on the N and S by Ciudad Real and Granada respectively Area, 5200 sq m The principal rivers are the Guadalquivir and the Segura, and the mountain ranges are the Sierra Morena, Sierras de Segura, Sierra de Pozo, Sierra de Cazorla and Sierra Magina The land is fertile and in the well-watered valleys grow the vine, olives, and cereals There are over 400 lead mines in the province, while iron and silver are also found Trade is done in timber, fabrics, and alcohol Pop (1931) 682,626 (2) Capital city of above, situated on the slopes of the Jabalcuz Mountains There are a number of Moorish ruins and a cathedral, built on the site of a former mosque in 1532 Pop (1931) 40,400

Jaffa or *Joppa*, ancient city and port on coast of Palestine, and port for Jerusalem Exports are oranges, corn, cotton, olive-oil, and leather Milling, soap, and furniture are the industries Since the post-War growth of the neighbouring Jewish city, Tel Aviv, Jaffa has steadily declined in importance In addition, the development of Haifa as a harbour and a port of call has delivered a serious blow at Jaffa as a port Pop (1931) 51,360

Jagersfontein, a town in Orange Free State, S Africa, situated over 1500 ft above sea-level The Klipfontein diamond mines (in which were found the "Excelsior" (971 carats) and "Jubilee" diamonds) are situated here Pop 4000

Jaggery (or *Jaggary*), an inferior sugar produced in S India and Malaya from the date palm

Jaguar, the largest species of the cat tribe found in Central and S America, is allied to the leopard (*p*), which it resembles in its yellowish hue and pattern

of ring like spots but is more powerfully built and has a shorter tail. It is



J ru

a good climber and feeds on deer and small animals but it seldom attacks man unless wounded or pressed by hunger. A black variety is found on the Amazon.

Jains (or *Ni granthas*) an Indian sect numbering over a million members founded by Mahavira (c. 6th cent. B.C.). They practise the strictest asceticism overcoming physical desires by continence and silence and the three main principles of their belief are right knowledge, right intuition and right conduct. They believe in reincarnation and take the most extreme precautions against taking life even of the minutest insects. There is an extensive literature the earliest parts of which date from the 4th cent. The temples of the sect are very beautiful notably those on Mount Abu. Jainism has much in common with Buddhism (q.v.).

Jaipur (1) Indian Native State in the Rajputana Agency. Area 15,679 sq. m. The greater part of the country is a sandy barren plain bounded N and W by hills. Towards the S and E.

the country is fertile. The agricultural products are negligible but there are rich mineral deposits the chief being marble, copper, iron and salt which is manufactured from the Sambhar Lake. Pop. (1931) 631,700. (2) City and capital of above. The chief



A Hindu astronomical instrument Jaipur built in 1723. It was tested and found to be still true in 1903.

buildings are the Maharaja's palace, an observatory, public library, hospital and a school of art. Jaipur is a prosperous commercial centre its manufactures include jewel-cutting, gold, enamelled work, metal work, cloths and muslins. Pop. (1931) 144,100.

Jalalabad, see JELLALABAD

Jalisco State of Mexico on the Pacific coast produces palm-oil, rubber, cotton, tobacco, sugar-cane and various minerals. Manufactures include leather, pottery and sugar. The Sierra Madre chain crosses the State the higher regions of which are volcanic. The chief river is the Lerma. The capital is Guadalajara. Area 33,402 sq. m. pop. 1,400,000.

Jam, see PRESARVA

Jamaica, largest and most important island in the British W. Indies c. 90 m. S. of Cuba in the Caribbean Sea. It was discovered by Columbus (1494) and remained in Spanish hands until 1855 when it was taken by the British. Area 4,100 sq. m. The island is crossed from E. to W. by a mountain chain the highest peak is Blue Mountain (7338 ft). Jamaicans possess innumerable rivers and streams but only the Black River and Caganita R. are navigable. Amongst

other important waterways are the Rio Minbo, Rio Cobre, Rio Grande, and Great Spanish R. The most important harbours in the island are Port Morant, Lueca, Falmouth, Port Antonia, Montego Bay, Port Maria, and St Ann's Bay. The climate is healthy and the soil rich. The profusion of orchids, aloes, and yucca is a special feature of the island. Jamaica produces much valuable timber, such as rosewood, mahogany, satin-wood, and ebony. Logwood is also cultivated extensively, and provides one of the principal exports. Other important products are sugar, molasses, rum, coffee, bananas, coconuts, cocoa, yams, beans, ginger, and arrowroot, as well as numerous sub-tropical fruits.

Jamaica's main industries are agriculture and the raising of live stock—cattle, sheep, horses, mules, and asses.

Administration is conducted by a Governor, a Privy Council, and a Legislative Council. There has been no established Church since 1870, but the Church of England has the greatest following. In 1931 there were 655 public elementary schools, 3 training colleges for women, 1 for men, and 2 secondary schools.

Regular steamer communication is maintained with England, U.S.A., and Canada; the island is well provided with railways (210 m) and main roads (2408 m).

Kingston, the capital, has a cathedral. There is a small garrison of Royal Engineers, Royal Artillery, and Infantry. Pop. of island (1931), 1,050,060.

James, name of three persons mentioned in the New Testament.

(1) James, the son of Zebedee, who occupied a venerated position amongst the Apostles and was, together with his brothers John and Peter, occasionally chosen to accompany Jesus. He was martyred in A.D. 44 (Acts xii 1, 2).

(2) James the son of Alphaeus, also an Apostle, and mentioned in each of the Gospels. Little is known of him, and he is sometimes identified with—

(3) James, generally regarded as the

brother of Christ, and called James The Just. By Jerome he is held to have been a cousin, as the term brother used in connection with James in the New Testament (Matt xiii 55) was capable of more than the one literal interpretation. He was head of the Church at Jerusalem, and whilst confessing his faith in the Messiahship of Christ from a pinnacle of the Temple, was set upon and thrown to his death. It is traditionally held that James was the writer of the Epistle in the New Testament which was described by Eusebius (c. A.D. 325) as a dispute book, but was definitely recognised as canonical in the 4th cent.

James I of England and **James VI** of Scotland (1566–1625), King of Great Britain and Ireland, son of Mary Queen of Scots and Darnley (*qv*), was declared King of Scotland in 1567 on the dethronement of his mother, but until 1583 the country was governed by a regency. In 1603 he succeeded Queen Elizabeth as holder of the English Crown. Apart from administrative reforms and the interest he took in industrial development, two main features mark his rule of Scotland. He destroyed the power of the barons and put an end to the anarchy which had disorganised Scotland for many years. He maintained the power of the State over the Church, and this brought him into conflict with the Presbyterians.

In England he tried the schemes which had marked his rule in Scotland. Credit must be given to James and his ministers for a determined effort to put into practice the Poor Law of 1601. His reign marks a stage in the growing conflict between the English Crown and the middle class that in the next reign ended in the Civil War. Antagonism to James on personal grounds intensified this conflict, originating in taxation and industrial regulation.

James II (1633–1701), King of Great Britain and Ireland, ascended the throne on the death of his brother, Charles II, in 1685. The conflict between Crown and Parliament reached

a further stage in the expulsion of James from the throne and the choice of William and Mary to reign jointly with many additional constitutional safeguards (see BILL OF RIGHTS)

James offended Parliament by dispensing with the Test Act (q.v.) and by his open pro-Catholic policy. The Declaration of Indulgence (q.v.) by which he freed Dissenters Protestant and Catholic from discrimination under the law was rejected by the Protestants as being only a trick and the trial of the seven Bishops for refusing to read this Declaration added to his unpopularity. In 1688 William of Orange was invited to come over and expel James who fled to France and attempted with Irish and French assistance to regain the throne. Beaten at the Boyne in 1690 he retired and devoted his time to religion. He died at St Germain in 1701 (see GLORIOUS REVOLUTION)

James I (1566-1625) King of Scotland. Captured by the English in 1604 while on his way to France he was kept prisoner until released on payment of a ransom in 1613. He was murdered in 1625. His reign saw the beginnings of constitutional monarchy. Author of a poem *The King's Quair*.

James II (1688-1702) King of Scotland from the death of his father 1688. In 1689 he murdered the Earl Douglas which act began a long period of civil war. He reformed the administration of justice.

James III (1451-1488) succeeded his father as King of Scotland in 1460. He kept peace with England until 1482 and as a result was beset with civil war at home. He was defeated by the rebels in 1488 and murdered.

James IV (1473-1513) King of Scotland. He led the rebellion against his father James III and came to the throne on his death in 1488. He was a popular king less cultured than his father. He was killed at Flodden when invading England.

James V (1512-1542) King of Scotland on the death of his father in 1513. He failed to make friends with

England led an invasion but was defeated at Solway Moss. The bitter persecution of heretics prevalent during his reign is generally ascribed to the influence of the clergy.

James, the Old Pretender see PRETENDER THE OLD

James, Epistle of, epistle of the New Testament traditionally said to be written by the brother of Jesus Christ (also known as James the Just). One of the characteristics of the book is the diversity of opinion between James and Paul regarding faith and works and in perusing those passages which deal with the subject (cf Jas ii 17 ff and Rom iii 28 iv Gal ii 16) it is clear that the writers mean different things by faith. Christ is only mentioned by name on two occasions whilst there is no mention of His Crucifixion or Resurrection. Some hold that the epistle is a pre-Christian Jewish writing afterwards adapted to Christian use. It was designated by Luther as an epistle of straw.

James Henry (1843-1916) American novelist lived mostly in England and France. His early works included many travel books and novels. *Roderick Hudson* (1875) *Portrait of a Lady* (1881) *Washington Square* (1881) etc. *Daisy Miller* (1878) was his first great success. His later novels are notable for their complex style and for their deep and intricate psychological analysis of character. They include *Watson* (1897) *The Wings of the Dove* (1900) and *The Golden Bowl* (1904). His other works include short stories (e.g. *The Turn of the Screw*) essays literary criticism and plays. He declared his sympathy with England on the outbreak of war in 1914 and became a naturalised Englishman in 1915.

James, William (1842-1910) American psychologist, son of Henry James (1811-82) the Swedenborgian propagandist and brother of Henry James the novelist. He came into prominence with the publication of his *Principles of Psychology* (1890) as the foremost protagonist of the physical school in

psychology. He was also a metaphysician of considerable standing. Amongst his other works are *The Varieties of Religious Experience* (1902) and *A Pluralistic Universe* (1900).

James of Hereford, 1st Baron (1828-1911), a lawyer of distinction, for many years M.P., Solicitor-General, and then Attorney-General under Gladstone, who offered him the Lord Chancellorship in 1886. He declined because he differed from Gladstone on Home Rule. He left the Liberal Party, and, becoming a Liberal Unionist, was Chancellor of the Duchy of Lancaster in Lord Salisbury's 1895 Government. He was created a peer in 1895.

Jameson, Sir Leander Starr (1853-1917), British colonial statesman, born in Edinburgh. He studied medicine in London, and emigrated to Kimberley, S. Africa, where he set up a successful practice. He became an intimate friend of Cecil Rhodes, and when Rhodes established the British S. Africa Company in 1890, he accompanied the first emigrants to Mashonaland. He was appointed administrator in the following year, and took an important part in the Matabele War of 1893. In 1895 he led the Jameson raid (*qv*) into Transvaal, was captured by the Boers, sent home, and sentenced to 15 months' imprisonment. He returned to S. Africa, and c. 1902 assumed the leadership of the Progressive Party, becoming Premier on its return to power in 1904. In that position he initiated many liberal measures, and took important steps to develop the resources of the country and secure the building of railways, etc. He resigned in 1908.

Jameson Raid, The. On Dec. 29, 1895, Dr Jameson, (*qv*) with the cognisance of Cecil Rhodes, led into the Transvaal a force of 600 armed men, ostensibly to protect the women and children on the Rand from alleged danger at the hands of armed Boers, ally, with the help of the Jo-

hannesburg "Reformers" (the discontented Uitlanders), to bring about a *coup d'état* which would result in the overthrow of the Kruger oligarchy. They were met on Jan. 2 by 200 Boers under Cronje at Krugersdorp (or Doornkop), and after losing killed and many wounded the whole column surrendered on condition that their lives were spared. The raiders were handed over to Great Britain. In July, 1896, Dr Jameson was sentenced in London to 15 months' imprisonment, and other officers to shorter terms. The Transvaal Government claimed £667,938 3s for material damages, and £1 million as "moral and intellectual compensation." Neither sum was ever paid, though Great Britain admitted liability. The raid was followed in 1899 by the Boer War (*qv*). It has since been disclosed that Rhodes urged Jameson not to enter the Transvaal, but that Jameson took the bit between his teeth.

Jamestown: (1) City of New York State, U.S.A., and a summer resort. It is a railway centre, and manufactures metal and wood furniture. The city is pleasantly set among hills, and farming is one of the occupations. Pop. (1928) c. 50,000.

(2) Former village in James City County, Virginia, U.S.A., where the first permanent English-speaking colony in America was founded in 1607; it is now a part of Williamsburg.

Jammes, Francis (b. 1868), French poet, is notable for his simple style and faith. *De l'Angelus de l'aube à l'Angelus du Soir* (1898), *Les georgiques chrétiennes* (1912), are among his best-known works.

Jammu, capital of State of Kashmir, and Jammu, on the Tawi R. Pop. c. 32,000.

Janina (or *Yanina*), a picturesque town of N. Epirus, Greece, built on a high elevation on Lake Janina. It is the most important town of Epirus, and the seat of a Greek archbishop. Besides its many churches, mosques, and syn-

gogues there are ruins of an old fortress a library Greek college and hospital The chief industries are the manufacture of gold and silver embroidery Janina was in turn invaded by the Serbs Macedonians Albanians and Turks during the Middle Ages It was captured by the Greeks in the first Balkan War in 1913 Pop 20 500

Janissaries, the standing army of the Ottoman Empire from the 14th to the 19th cent composed originally of 1000 Christian youths taken yearly from their parents and trained for military service and simultaneously in the Mohammedan religion

The corps became an increasingly honourable one and entrance to it was highly esteemed Its strength rose from 40 000 in 1514 to 50 000 in 1591 finally reaching the figure of 135 000 in 1686 They received no pay except in war time but were allowed to practise a trade The last of their frequent mutinies in 1806 resulted in the massacre of the corps

Jansen, Cornelius (1585-1638) founder of Jansenism (q.v.) He entered Louvain University in 1600 During the conflict which was at this time raging between the Jesuits and a group of people who adhered strictly to the teaching of Augustine on grace Jansen ranged himself against the Jesuits He had plans for the reformation of the Church and resisted with all his power Jesuit influences and beliefs He travelled extensively and lectured and in 1630 was appointed Professor of Scriptural Interpretation at Louvain and 6 years later was made Bishop of Ypres His famous work on Augustine's theology *Augustinus* was published 3 years after his death Jansen had many disciples amongst whom were Pascal and Antoine Arnauld

Jansenism, a school of Christian thought rather than a sect named after Cornelius Jansen (q.v.), which attached especial importance to Grace Jansen was a student of Augustine and prepared a great work,

Augustinus which was published posthumously and caused considerable controversy It contained five main propositions touching upon the Grace of Christ which he defined as inward remedial aid and a real power The work was banned by the Inquisition as heretical A Jansenist church exists in Holland having been started in connection with the Old Catholic (q.v.) Church in that country

Janus (JAN-əs) in Roman mythology the god of beginnings and so of gates doors and avenues He gives his name to January the beginning of the year The Temple of Janus at Rome was shut in times of peace and opened in times of war because he was said to help the Romans in their battles He is shown sometimes with two and sometimes with four faces

Japan (Jap Nippon) empire of Eastern Asia consisting of a chain of islands including the Kuriles S Sakhalin Hokkaido Honshu Shikoku Kyushu Lu-chu Group Formosa and the Pescadores with Korea on the Asiatic mainland The N Pacific Ocean is on the E shores and the Sea of Japan on the W between Korea and the islands Mountains traverse the islands N-S among which are numerous active and dormant volcanoes There are many lofty summits chief among them Fujiyama (12 400 ft.) with its beautiful cone c 80 m SW of Tokyo In the provinces of Hida and Echū on the same island are a group of mountains known as the Japanese Alps of which Ontake (10 400 ft.) Tateyama and Yariyama are the chief The Nikko Mountains on the E of the main island are picturesque with 8000 ft. peaks Asamayama (8100 ft.) is an active volcano The highest peak on Shikoku is Ishizuchi-san (7777 ft.)

Earthquake tremors are frequent and during the last 200 years 18 catastrophes involving a death-roll of over 154 000 have stricken the islands

Japan possesses a number of hot mineral springs and is well watered

with rivers. They are short, and so broken by shallows that only flat-bottomed vessels can negotiate them. Most important waterways are Ishikari-gawa (275 m), Shinano-gawa (225 m), and Teshio-gawa (192 m).

Climate This varies greatly, ranging from sub-tropical in the S to sub-arctic in the N. The rainfall is high, Sept being the wettest month, with heavy rain also in the summer. The country is subject to typhoons in summer and autumn.

Flora and Fauna The great variety of trees includes oak, maple, pine, birch, beech, chestnut, elm, and bamboo.



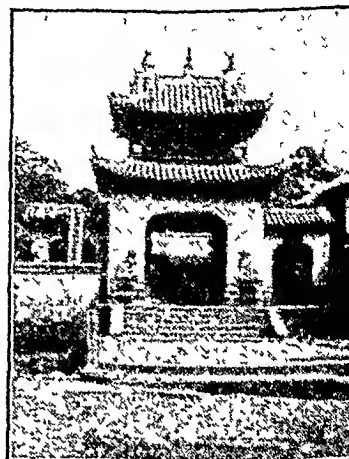
Japanese lady in a rickshaw, the national carriage

Of flowers, most beautiful are azaleas, narcissi, *Camellia japonica*, lotus, chrysanthemum, wisteria, and peony. Loquats, grapes, peaches, and oranges are amongst the many fruits.

Bear, fox, monkey, badger, marten, boar, and stag are most important of Japan's wild animals. Birds are numerous, and there are c 90 recognised species of reptiles, only one snake, the *mamushi*, is venomous.

Minerals Copper and coal (anthracite and bituminous), are Japan's chief minerals, but gold, silver, iron, and petroleum are also found in limited quantities. Gold-mining was first practised in the 7th cent.

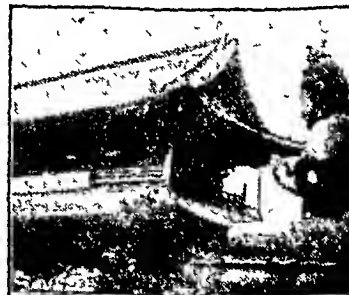
In architecture, art, embroidery and ceramics, the Japanese, deriving inspiration from China, have proved themselves to be masters. They



Entrance to the Shinto Temple, Ō-Suwa, Nagasaki

lovers of sports, physical culture, wrestling, and jumping.

Religion Shintoism (qv) was a primitive religion, Buddhism being introduced in the 6th cent from China.

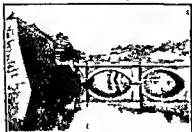


Kaminari Mon or Gate Building of the Kamigasaki Temple, near Tokyo

To-day there is absolute religious freedom. Chief religions are Shintoism (with 13 sects) and Buddhism (with 12 sects), Christianity, in

duced by Francis Xavier in 1549 has over 1740 Roman Catholic Greek and Protestant churches

Government The Emperor (known



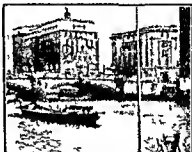
The Emperor's Palace. The Two-fold Bridge. The main entrance to the Japanese Imperial Palace at Tokyo. The palace is surrounded by deep moats crossed by marble bridges and planted with trees.

by his subjects as *Tenno*, son of heaven and generally called the *Mikado* by foreigners) is the head of the State. The present emperor HIRONO is the 123rd of his line. Government is divided into 11 departments ruled by a Cabinet on the Western model. There are two houses of the Diet—Peers and Representatives. The former consists of Princes of the Blood, Princes and Marquesses, Counts, Viscounts and Barons, men of education or distinguished service and representatives of the highest taxpayers in all 404 members. The house of representatives comprises 466 elected members.

Army and Navy In 1868 the military system of the country assumed Western features and from thenceforth the Army developed with remarkable rapidity. To-day it is a very efficient fighting machine. Less than 80 years ago the first seamen's training station was opened at Nagasaki under Dutch instructors. Two years later training vessels were added and Queen Victoria presented a warship. The fleet to-day makes Japan the third great naval Power of the world.

Japan has since the one of the leading

industrial countries in the world. Cotton, silk, chemical goods, cutlery, toys and machinery are exported in vast quantities. Her exports are greatly assisted by the depression of her currency enabling her to undersell every other manufacturing country. Other products are rice, barley, wheat, rye, beans, peas, potatoes, millet, cotton, hemp, indigo, tea, tobacco and mulberries (for silkworms). Oxen, sheep, horses, goats and swine are raised. Principal imports are raw cotton, wool, worsted, yarns, wrought iron, coal, machinery and wood and mineral oils. The largest towns are Tokyo, the capital (5,311,000), Kyoto, Yokohama (690,960), Osaka (2,453,569), Kobe, Nagasaki and Hiroshima. There are over 40 ports, the principal being Yokohama, Dairen



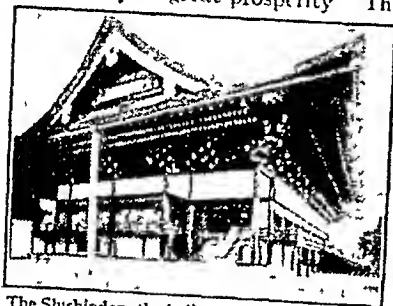
The Nippon Bank Building in the Nishi-Shinjuku (Nishi-Shinjuku) district of Tokyo. The building has been largely rebuilt since 1923 and many of the building follow the American pattern.

(Kwangtung territory), Kobe, Hakodate, Osaka, Nagasaki, Moji and Fusan.

History According to ancient chronicles the first human sovereign was Jimmu c. 660 B.C. The conquest of Korea by the Empress Jingō took place c. A.D. 301. Buddhism was introduced from Korea in 552. About 645 the powerful clan of Fujiwara became prominent, governing the State as the Emperor's agents for 5 centuries until overthrown by the rival clan of Minamoto. Civil War broke out lasting about 50 years. About 1159

the accession of the emperor Nijo was secured, but some years later Yoritomo, son of the Minamoto leader, became ruler. About 1205 the house of Hojo came to power. The Hojos were eventually driven from power in 1331 and Go-Daigo was set on the throne, but he was soon deposed, and the Emperor Komyo appointed.

In the mid-16th cent the Portuguese discovered Japan. They introduced Jesuits, but these were ordered out of the country by Hideyoshi, who considered them a menace to the State. Hideyoshi carried out a number of reforms and conquered Korea (1592-98). His brother-in-law, Tokugawa Iyeyasu, set up a feudal system (1603) and led the country to great prosperity. The



The Shishinden, the hall at the Mikado's palace, Kyoto, in which the Emperor was crowned

Tokugawa dynasty retained power until 1868. In 1600 the Dutch were given a licence to trade. About the same time, Will Adams, an Englishman, storm-driven to Bungo, was appointed adviser and diplomatic agent. Intercourse with all foreigners except the Dutch was banned until 1853, when commercial treaties were concluded with America, Russia, and Britain. In 1867 feudalism disappeared with the resignation of the last Shogun.

With the final disintegration of feudalism came many reforms—reorganisation of the Army and Navy, and the opening of the first railway in 1872. The war with China in 1894 gave Japan the island of Formosa and

a free hand in Korea. In 1902 the Anglo-Japanese Treaty was signed. Negotiations between Japan and Russia proposing that each should respect the other's status in Manchuria and Korea respectively, broke down, and the Russo-Japanese war (*qv*) broke out on Feb 6, 1904. Russia was defeated and peace concluded on Sept 5, 1905. Russia agreed to evacuate Manchuria, transfer to Japan Russia's lease of the Liaotung peninsula, and to recognise Japan's political, military, and economic interests in Korea.

A new treaty was signed between Japan and England during the same year, whereby peace was to be maintained in E Asia, and preserving the commercial interests of all Powers in China (the policy of the "Open Door"). In 1912, the Emperor Mutsuhito (better known as Meiji) died, and was succeeded by Yoshito, his third son, who became known as Taisho, or Great Righteousness. Japan declared war on Germany on Aug 23, 1914, and Tsingtao, the chief town in the German leased territory in China, was occupied by the Allies on Nov 16. The Emperor Taisho died on Christmas Day, 1926, and was succeeded by Hirohito as prince regent.

By the Washington Treaty for the limitation of naval armaments, 1922, the Japanese Fleet was placed on a definite ratio with the fleets of England and USA. Controversy over Manchuria (*qv*) continued till, in 1931, Japanese troops drove out the Chinese. China appealed to the League of Nations and a commission, under the chairmanship of Lord Lytton, investigated. The Lytton Report was adopted by the League but rejected by Japan. Meanwhile, Japanese troops attacked the Chinese in the outskirts of Shanghai but, upon conciliatory efforts by the Great Powers in co-operation with the League of Nations, the territory was evacuated.

Area, 263,359 sq. m., including mandated islands of Pacific, pop. (1930) 91,792,639.

Japanese Language, The cannot very conveniently be classed as a member of any particular group though some scholars have tried to show that it has affinities with the Altaic. In general character it is agglutinative (*gu*). The spoken language is distinct from that represented in writing although the tendency now seems for this distinction to lose its sharpness. Colloquial Japanese is made up of the various possible combinations of its 50 syllabic sound. The inflexional system of its grammar is in some respects cumbersome but as regards gender and declension and conjugation it is far less complicated than most Indo-European languages and the syntax is comparatively simple. The originally poor vocabulary has been augmented by extensive borrowing from other languages especially Chinese and English. The written character was borrowed in the 3rd cent. from the Chinese ideographs to which in the course of time a distinctively Japanese pronunciation was given. An educated Japanese can read and write c. 8000 of these ideographs but the total number of them is very far in excess of that figure.

Japanese Literature begins in A.D. 712 with the *Kojiki*, a history of the creation and of the beginnings of the Japanese race. From then to the end of the 14th cent. was the period of the development and perfection of the typically national poetry which consists of two forms of versification the *tanka* of 5-7 5 7 7 syllables and the *haikai* of 5-7-5 syllables. Akahito and Hitomaro in the 8th and Tsurayuki in the 10th cents. are the greatest of the classical poets and this period saw the collection of a series of anthologies. The period c. 1470-1675 saw a general decline in literature relieved only by the development of the drama which rapidly became the most popular literary medium in the Tokugawa period (1603-1867) which followed. Literature in general during this period, was influenced first by Chinese

philosophy and teaching and later by Western and particularly English thought. The Meiji era (1867-1912) began with great activity in the translation of Western authors and their influence was apparent in the native literature. Towards the end of the era Japanese writers degenerated into indiscriminate and uninspired imitators of every sort of Western model to the neglect of the true genius of their national literature.

The Taihō era which succeeded the Meiji era in 1912 was almost completely dominated by the Russian influence with results that are not always very happy since the Russian and the Japanese geniuses do not easily blend. A woman writer Yayoï Nogami has produced in *The Sea and Skip* an outstanding novel and is moreover the translator of Bernard Shaw. Natsume Sôseki, Kikuchi Kan and Kikuchi Yuhō were novelists of great popularity but it is doubtful whether posterity will confirm the judgment of their contemporaries. A play *The Priest and his Disciples* by Kurata Hyakuzo has been translated into English (1923). The one modern author who has stood out for the preservation of the true traditions of Japanese literature is Matsura Hajime and he has given noble expression to his convictions in *The Pure White Light of Literature*. See W. G. Aston *Japanese Literature* (1908). See also NO PLAYS.

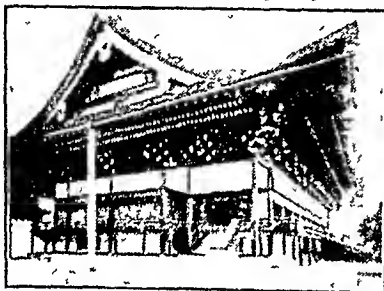
Japan Wax, a vegetable fat from trees of the *Thus* species found in Japan. Chemically it is a fat and not a wax. It is used in making polishes its value depending on certain characteristic fatty acids.

Jarrow Wood, hard and durable timber of the Australian tree *Eucalyptus maculata*. It is exported and used for plating railway sleepers and paving blocks.

Jarrow river port in County Durham on the R. Tyne. There are some interesting ruins of a 7th-cent. monastery where the Venerable Bede spent his life. Shipbuilding, paper-making and chemicals are three of

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a free hand in Korea. In 1902 the Anglo-Japanese Treaty was signed. Negotiations between Japan and Russia proposing that each should respect the other's status in Manchuria and Korea respectively, broke down and the Russo-Japanese war (*qv*) broke out on Feb 6, 1904. Russia was defeated and peace concluded on Sept 5, 1905. Russia agreed to evacuate Manchuria, transfer to Japan Russia's lease of the Liaotung peninsula, and to recognise Japan's political, military, and economic interests in Korea.

A new treaty was signed between Japan and England during the same year, whereby peace was to be maintained in E Asia, and preserving the commercial interests of all Powers in China (the policy of the "Open Door"). In 1912, the Emperor Mutsuhito (better known as Meiji) died, and was succeeded by Yoshito, his third son, who became known as Taisho, or Great Righteousness. Japan declared war on Germany on Aug 23, 1914, and Tsingtao, the chief town in the German leased territory in China, was occupied by the Allies on Nov 16. The Emperor Taisho died on Christmas Day, 1926, and was succeeded by Hirohito as prince regent.

By the Washington Treaty for the limitation of naval armaments, 1922, the Japanese Fleet was placed on a definite ratio with the fleets of England and USA. Controversy over Manchuria (*qv*) continued till, in 1931, Japanese troops drove out the Chinese. China appealed to the League of Nations and a commission, under the chairmanship of Lord Lytton, investigated. The Lytton Report was adopted by the League but rejected by Japan. Meanwhile, Japanese troops attacked the Chinese in the outskirts of Shanghai but, upon conciliatory efforts by the Great Powers in co-operation with the League of Nations, the territory was evacuated.

Area, 263,359 sq m, including mandated islands of Pacific; pop (1930) 91,702,630.

Java, an island of the Dutch F Indies fourth in area, but most important of the islands of the Malay Archipelago lying S.E. of Sumatra bounded N by the Java Sea and S by the Indian Ocean. Java is c 640 m long and c 10 m at its greatest width. Area (including Madura a small island on the N.E. coast) is 50 750 sq m. A mountain chain kendang extends the full distance W to E whilst

From Dec to March with the arrival of the N.W. monsoon there is rain in the N the wet season in the S is from April to Oct.

Flora and Fauna Coconut trees and mangroves are found along the coasts. Just inland are tracts well cultivated for the growing of sugar rice tobacco cinnamon cotton tea and rubber. One of Java's most important sources of wealth is her timber



J. near Dancu.

Middle and E. Java are separated by the Kedu Valley. Along the N coast of the island extend alluvial plains to the coast on the S rises steeply to the main mountain range which has many active volcanoes. Some of the highest peaks are Gedeh Smeru and Sumbing. Principal rivers are the Solo Brantas Tarum and Manuk. The island seldom experiences extreme temperatures. Along the coast it is rather hot but on the heights it is cool and the climate generally healthy.

The mountains are covered with extensive forests which produce teak palms coconuts and bamboos as well as a profusion of ferns and fungi. It is said that there are over 5000 species of plants in Java. Among the principal flowers are orchids magnolias rhododendrons myrtles lilies of the valley guelder rose and foxgloves. Animals include the tiger leopard rhinoceros (one horned) ox and pig. There are crocodiles and more than 100 species of snakes. Birds of brill

liant plumage are found in the forests. Petroleum, coal, sulphur, and iodine are amongst the various minerals found.

Chief exports are coffee, tea, sugar, timber, copra, tobacco, and tin, imports include hardware, bean cake, and cottons. The principal industry is the manufacture of cloth.

Chief towns are Batavia, capital, Surabaya, Samarang, and Surakarta. The majority of the natives are Mohammedans, but Christianity and Buddhism have their followers. Java has c 4000 m of railways and a road mileage of 15,700, there is regular steamship connection with most parts of the world.

Java is the most densely populated land mass of the world, having 820 people per sq m. Pop., including Madura (1930), 41,719,524.

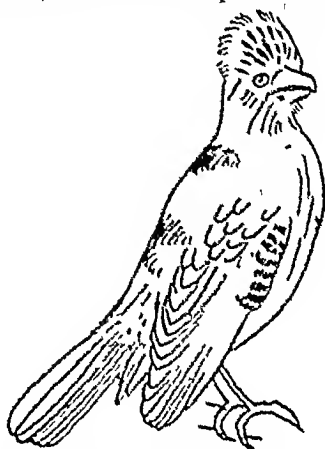
History Java was first visited in c AD the 1st cent by the Hindus. About the 15th cent the Hindu Empire was overthrown by the Mohammedans. In 1520, however, the Portuguese appeared. Towards the end of the century Dutch traders arrived, and the Dutch E India Company was formed in 1602 and resulted in the gradual annexation by the Dutch of the greater part of Java, they acquired the Preanger district by treaty in 1705, and Bantam a century later.

The island was taken by the French during the later Napoleonic Wars, but they were defeated at Weltevreden in 1811 by the British, who occupied the island for 6 years, then returned it to the Dutch. In 1825, Java rebelled, led by Dipa Negara, who was defeated in 1830.

Javelin, light spear for throwing, often with a thong attached to give greater force in projection. A body of javelin-men were formerly attached to a sheriff, and protected the judges on assize. Javelin-throwing is now only practised as a sport, and is an important event in the International Olympic Games.

Jay, bird belonging to the Corvidae family, but distinguished by its

of hopping instead of walking and by its softer, lustreless plumage, which is cinnamon brown varied with black and white patches and a patch of blue bars on the wing. The jay is a shy bird, seldom leaving the shelter of woods, and is now comparatively rare.



Jay

in England owing to the activities of gamekeepers.

Jazz, a style of rhythmic syncopated music developed specially for dancing. It was derived from rag-time music, made popular by Alexander's Rag-time Band just before the World War. Such music exploited a few tricks in syncopation exhaustively and monotonously.

Rag-time showed singularly little development during its decade of favour, but jazz, which succeeded it as a popular dance style, has, within limits, been affected by many changes in manner and matter. Jazz came from America, where it is supposed to have originated in the traditional music of the negroes.

The workmanship displayed in even the early jazz compositions was superior to the dance music preceded it, while the players was sometimes. The essential syncopated

rhythm became much more subtle and the best writers have produced striking effects of harmony and instrumentation. But only the fringes of serious music have been touched. Dance orchestras however have become very serious affairs indeed. Ever since the early days of Paul White man's and the Savoy Orpheans bands the latter being one of the first composed of selected instrumental virtuosos, the foremost dance bands in the world have been polished and skilful combinations whose wonderfully precise rhythm and smooth execution must please any musician. The compositions played chiefly exploit a facile melancholy put across with all the wiles of expert and interesting orchestration and astounding virtuosity by individual instrumentalists.

Jean de Meung (c 130-c 1300) French poet continued the famous French romance *Le Roman de la Rose* after the death of Guillaume de Lorris. His contribution was a satire on political and monastic matters and on women. His style is easy and precise a great advance on earlier French verse.

Jeanna d'Arc, see JOAN OF ARC SAINT

Jeans Sir James Hopwood (b 1877) English mathematician renowned for his work and speculations on the nature of the universe. He was educated at Cambridge University, holding an aptitude for pure mathematics being second Wrangler in 1898 and Smith's prizeman in 1900. In 1904 he was Professor of Applied Mathematics in Princeton University, USA, and became Stokes Lecturer on Mathematics at Cambridge in 1910. His work includes numerous monographs as well as popular mathematical and philosophical expositions, most notable are *Radiation and the Quantum Theory* (1914), *Astronomy and Cosmogony* (1918), *The Universe Around Us* (1929), and *The Mysterious Unseen* (1930). For his theory of the nature of the universe see **EARTH SOLAR SYSTEM**.

Jedburgh, Royal burgh and county

town of Roxburghshire Scotland situated on the Jed stream. It is famed for the ruins of a beautiful abbey founded by David I early in the 12th cent. The town played an important part in the Border Wars. The castle built by David I was captured by the English and destroyed in 1409. Its site now being occupied by a disused gaol. Jedburgh was used as a royal residence by Mary Queen of Scots and the Young Isabella tender stayed there. The chief manufactures are woollen with tanning and corn milling. Pop 3050.

Jefferies, Richard (1814-1887) English novelist and naturalist author of an autobiography *The Story of My Heart* and several novels and works on field natural history including *The Life of the Fields* (1884), *The Gamekeeper at Home* (1878), *Beats the Story of a Bird After London or Wild England* etc.

Jefferson, Thomas (1743-1826) 3rd President of the United States. He was an ardent scholar of classical and the sciences and a fine musician and horseman. He was admitted to



Sir James Jeans.

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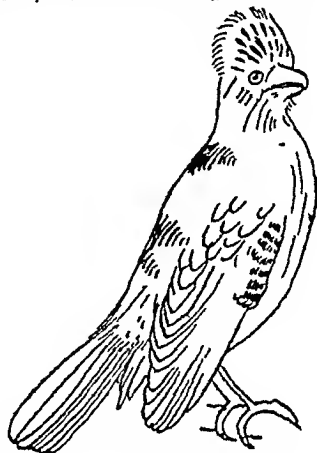
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neglect The city was occupied by the Japanese in 1933 during their invasion of China

Jehovah (*Yahveh* or *Jahveh*) the name of the God of Israel now widely regarded as a mispronunciation of the Hebrew YHWH. The form Jehovah appears to have been introduced as late as the 16th cent. by Christian theologians. By Jews the actual pronunciation of the name of God was from time immemorial avoided and was uttered in ancient times only during the Temple service principally on the Day of Atonement.

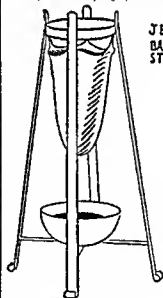
In Josephus and the Church Fathers neither the pronunciation Jehovah nor any other pronunciation of the Divine four lettered word is indicated. Instead it is always referred to as the Tetragrammaton. In the reading of the Name in Hebrew the vowels of the word Adonai (Lord) are attached to the letters YHWH and it is generally read as either Adonai (Lord) or Elohim (God).

Jellalabad (or *Jalalabad*) fortified town in Afghanistan between Kabul and Peshawar near the Khyber Pass. Trading in timber and fruit. It was founded in the 16th cent. by Akbar. Pop. c 4100.

Jellicoe, John Rushworth Jellicoe 1st Earl, British admiral born (1859) of a seafaring family. He joined the training ship *Britannia* at the age of 15 being promoted lieutenant at 20. He was with H.M.S. *Agincourt* at the bombardment of Alexandria (1882) and fought at Tel-el-kebir. After taking a prominent part in the Peking expedition (1900) he became naval assistant to the Controller of the Navy for a year and in 1905 Director of Naval Ordnance in which capacity he greatly improved naval gunnery being made rear admiral in recognition of this service (1907). After serving with the Atlantic Fleet in 1907-8 he was made Lord Commissioner and Controller of the Navy 1909-10 and vice-admiral in the latter year. In 1911 he became Second Sea Lord and at the beginning of the World War

received the command of the Grand Fleet being promoted full admiral after eight months. He commanded the British fleet at the Battle of Jutland from H.M.S. *Iron Duke*. In Nov. 1916 he passed the command to Sir David Beatty on becoming 1st Sea Lord. He was made Viscount Jellicoe of Scapa in 1918 and Admiral of the Fleet in the following year. A world tour in H.M.S. *New Zealand* was followed by his appointment as Governor of New Zealand. He retired in 1914 and in 1915 was created Earl Jellicoe and Viscount Brocas of Southampton. He has published authoritative works on the Grand Fleet and naval warfare.

Jelly a liquid stiffened with gelatine. The liquid may be water flavoured with meat and vegetables (*see Aspics*) with fruit juices or with wine. Other additions may be made such as egg white (*snows* or *sponges*) cream and



**JELLY
BAG ON
STAND.**

Method of draining jelly

the Bar in 1767, but abandoned practice in 1774, on inheriting an estate from his father. He became J. P., member of the house of burgesses in 1769, and of the Continental Congress in 1775. He was made Governor of Virginia in 1779, went as envoy to France, and became Secretary of State in Washington's first Cabinet. Here he found himself in bitter opposition to Alexander Hamilton, whose autocratic philosophy and support of the commercial and business interests was entirely contrary to his own democratic sympathy with the farmers and the West.

Jefferson ran several times in the Presidential elections and was eventually returned in 1801, being re-elected in 1805. Besides reducing the national debt and suppressing piracy, he took an important step in American history by purchasing over a million sq miles of Mississippi territory from Napoleon, who had taken it from the Spanish. This gave a huge impetus to continental expansion and brought the natural river outlet of the interior into American hands.

Jefferson refused to stand for the presidency a third time, but retired to his home in Albemarle County, Virginia. He is regarded as one of the greatest champions of democracy, and revered for his part in the authorship of the Declaration of Independence.

Jeffrey, Francis, Lord (1773-1850), Scots judge and literary critic, was editor of the famous *Edinburgh Review* (founded 1802). He is best known for his indiscriminate and savage attacks on the younger romantics, among them Keats and Shelley.

Jeffreys, George Jeffreys, 1st Baron (1648-1689), Lord Chancellor of England. While studying law in the Inner Temple, he became addicted to drinking and riotous living. He was, nevertheless, a brilliant lawyer, being called to the Bar at the age of 20, and elected Common Sergeant of the City of London 3 years later. He was knighted in 1677 and made Solicitor-General to the Duke of York in the following year.

In 1678 he began his career in the conduct of State trials, in connection with Titus Oates's revelations of the Popish Plot. He supported the Court party at the cost of some of his prestige in the city, and in 1683 was made Lord Chief Justice and conducted the Crown prosecution against the Rye House plotters. He secured the surrender of many municipal charters to the crown and was rewarded, in 1681, with a position in the Cabinet, and in 1682 with a peerage. His trials now became marred by his ungovernable temper, and his commission at Winchester in 1685, which executed 320 and transported many hundreds into slavery as punishment for the Monmouth Rebellion, became known as the "bloody assize." Returning to London, he was made Lord Chancellor (1685). On James II's flight in 1688, Jeffreys attempted to escape, but was arrested and consigned to the Tower, where he died.

Jeffries, James J. (b 1875), American boxer, won the World's Heavyweight Championship by beating Bob Fitzsimmons (qv), 1899, retired, 1906, made an unsuccessful attempt at a "come-back" in 1910, when he was knocked out by the negro champion Jack Johnson (qv).

Jehol, the "city of the Emperors" in ancient China. It contained magnificent palaces and summer residences set in exquisite surroundings.



Residential Quarter of Jehol City

The buildings, including some noble temples, are falling into decay through

with great speed like kangaroos and by their long tufted tails. Jerboas live in the deserts of Central Asia and N Africa lying up in burrows during



Jerboa.

the day and coming out at night to feed

Jeremiah, last pre-exilic prophet in the Bible, son of Hilkiah, prophesied under five kings, born at Anathoth $3\frac{1}{2}$ m from Jerusalem. The book of Jeremiah is remarkable for its prophecies and the biographical material it contains through Baruch, Jeremiah's collaborator.

Jeremy Epistle of, the sixth chapter of the Book of Baruch in the Apocrypha. It is prophetic in character and warns the exiles against false gods and the worshipping of idols. The Epistle may have been written about the 1st cent. B.C.

Jericho, a town in Palestine, 15 m. N.E. of Jerusalem. It was captured by the Israelites under Joshua, re-fortified in the reign of Ahab, but was destroyed by the Romans and rebuilt by Hadrian. Jericho has changed its site many times and excavations have revealed many interesting features which strongly support the Biblical narrative of its capture by Joshua.

Jeritz, Maria, dramatic soprano, born in Brinn. She first appeared in 1912 at Vienna and made a great reputation in the United States after the World War, before she appeared in London in 1915. She caused much comment by her sensationally unconventional performances of such rôles as Tosca and Thais.

Jerome St (c. 340-420), born of Christian parents, was educated in Rome, where he attended schools of philosophy. During a serious illness at Antioch in 373 he had a dream in which he saw Christ, who reproached him for caring more to be a pagan than a Christian. From this time until 379 he lived the life of a hermit. Ordained a presbyter in 379, he journeyed to Constantinople, remaining there until 38, when he went to Rome, where he devoted himself to writing, preaching, and teaching Hebrew. In 384 he travelled to Palestine and Egypt, returning to Bethlehem to preside over one of the four monasteries built by Paula, a wealthy Roman lady. He died after a long illness at Bethlehem.

Jerome was more gifted as a scholar than as a guide of souls. His greatest work was the Vulgate version of the Hebrew Scriptures. His feast is Sept. 30.

Jerome, Jerome Klapka (1859-1917), English novelist and playwright, was the author of the famous humorous novel *Three Men in a Boat* (1890). His other humorous works include *Idle Thoughts of an Idle Fellow* and *Three Men on the Bummel*. Equally famous was his play *The Passing of the Third Floor Back* (1907).

Jerome Bonaparte, see BONAPARTE, JEROME.

Jerome of Prague (c. 1365-1416), an early Bohemian Church reformer who was influenced by the writings of Wyclif and John Huss. He denounced the greed and loose living of the clergy and was accused of heresy. In 1416 he was tried by a council and although he denounced the doctrines of Wyclif and Huss, he was burnt at the stake on May 30, 1416.

Jerrold, Douglas William (1803-1871), English dramatist and humorist, known chiefly for his play *Black-eyed Susan* (1839) and for his *Mrs. Caudle's Curtain Lectures* (1846).

Jersey, the largest and most S. of the Channel Islands (qv), lying c. 10 m. from Southampton and nearly 16 m. from the Normandy coast. It is 10 m.

cream with custard (Bavarian cream or Bavaroise), custard (*honeycomb mould*), or cream mixture surrounded by bread or cake (*charlottes*)

The *gelatine* can be obtained either in leaf or powdered form. The latter is usually used, being convenient to handle and easily dissolved. Quantity required, from 1 oz to 1 pint, but this varies according to the weather, the size of mould (large requires less than small individual moulds), and the ingredients, those containing cooked egg or other thickening agent requiring less than plain jellies

General Method.

1 Fill moulds with cold water, and allow to stand

2 Soak gelatine in a little cold water

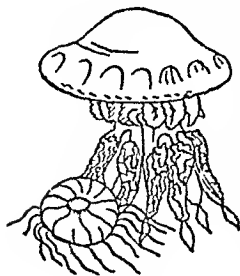
3 Add part or whole of boiling water to soaked gelatine to dissolve it

4 Dissolve sugar in the mixture

5 Strain fruit juice through muslin. Fruit jellies may be cleared

6 To turn out, dip in hot water, wipe the mould, invert plate over top, turn over, and shake

Jelly-fish, or *Medusæ*, a general name for the free-swimming Coelenterate animals (*qu*) which, like the tropical Portuguese Man-of-War, may be composed of a colony of individuals or may be solitary like the familiar



Jellyfish

in diameter, have strong stinging powers

Jemappes, town in Hainault province, Belgium, where, on Nov 6, 1792, the French under Dumouriez gained a

decisive victory over the Austrians under the Archduke Albert

Jena [*YANA*], town near Weimar, Thuringia, where on Oct 14, 1806, two battles were fought on the same day between the French and the Prussians: the one at Jena, the other at Auerstaedt, a few miles distant. At Jena 100,000 French under Napoleon defeated 60,000 Prussians and Saxons under Prince Hohenlohe. At Auerstaedt Davoust with 35,000 defeated 50,000 Prussians under the Duke of Brunswick

Jenkins' Ear, War of, the popular name of a war which broke out between Great Britain and Spain in 1731 and became merged in the War of the Austrian Succession. Its immediate cause was the grievance of an English mariner, Robert Jenkins, who alleged that in 1731 he had been tortured by the Spaniards, who had torn off his ear

Jenner, Edward (1749-1823), of Berkeley (Glos.), introduced vaccination as a prophylactic measure against smallpox. He noticed that milk-maids who caught cowpox from the sores that gathered on the udders of the animals they tended did not take the smallpox, and after 18 years' research he performed his first vaccination on a country boy, using matter from the arm of a milk-maid. Two months later he injected smallpox into the boy, who did not take the infection. He prepared a report for the Royal Society, but it was rejected, one case not being proof enough. Two years later, with 23 successful cases in hand, he published his book, *Inquiry into the Cause and Effects of the Variolæ Vaccinæ*. See VACCINATION

Jenner, Sir William, Bart. (1815-1898), English physician. He is important in the history of medicine as the first to distinguish between *typhoid* and *typhus* fevers. He was president of the Royal College of Physicians 1881-8

Jerboa, name for a family of Rodents related to the rats and mice, but distinguished principally by their very long hind legs, upon which they hop

and fortifications, rebuilt the Temple and erected a palace defended by three towers. A period of prosperity followed but in A.D. 70 the Romans under Titus attacked and partially destroyed the city. The Jewish War of Freedom A.D. 132 resulted in the defeat of the Jews and Jerusalem suffered almost complete destruction. A new city named Aelia Capitolina was built under Hadrian in which Jews were denied residence. In A.D. 614 Chosroes II of Persia captured Jerusalem and in A.D. 637 it was taken by the Mohammedans under Omar who built a mosque near the site of the Temple. Jerusalem was captured by the crusaders under Godfrey de Bouillon in July 1099 but Saladin recaptured it in Oct. 1187 and repaired the walls. The city remained in Moslem hands except for two short periods until 1918 when it was captured by British forces under General Allenby who made his entrance by the Jaffa Gate. See also CRUSADES.

Since the World War Jerusalem has been developed extensively. Mainly under the influence of the Jewish return following the issue of the Balfour Declaration (1917) declaring Palestine a National Home for the Jews new Jewish suburbs have been erected. Schools have been built, electricity introduced and a new impetus imparted to the growth of the city. Pop. (1931) 90,400.

Jespersen, Jens Otto Harry (b. 1860). Professor of English at the University of Copenhagen and a prominent Danish philologist. His books include *Grammar and Structure of the English Language* and *Essentials of English Grammar*.

Jessamine see JASMINE

Jessel, Sir George (1844-1933). English judge born in London of Jewish parents. He was called to the Bar (1847), entered Parliament (1850) and was appointed Solicitor-General under Gladstone (1871), Master of the Rolls (1873) and President of the first Court of Appeal (1881). The success of the new Judicature Acts was largely due

to his first administration and interpretation of them.

Jester in mediæval times a retainer to a noble or royal household who was privileged to say sharp things without punishment. The Court Fool or jester to royalty in England wore motley and a bell or pig's ear attached to the end of a pointed cap. He usually carried a balloon on the end of a stick. He often enjoyed a very privileged position and much influence at Court.



Jester

Jesuit, religious Order founded by St. John Colombini, a high official of Siena in 1560. The Order was confirmed by Urban V in 136 and became known as *Aquatic Fathers* by reason of the practices of distillation and pharmacy which were carried on by many of the brothers.

Jesuits see JESUIT SOCIETY OF

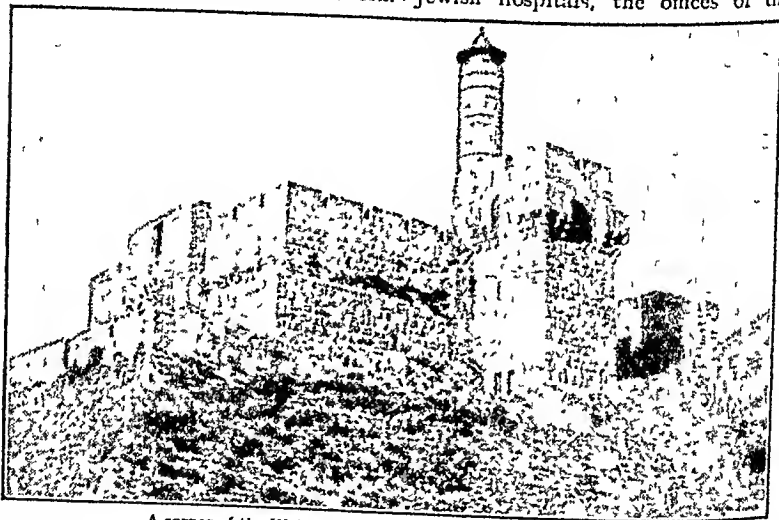
Jesus Christ (*Jesus* the personal name is the Greek form of *Yeshua*, Aramaic Saviour, *Christ* from Gr. *Chrestos* meaning Anointed) the founder of Christianity. Practically the sole source of information concerning Him is the writings of the New Testament (q.v.), particularly the first 3 Gospels though some additional data are to be gleaned from the Gospel of St. John, the Epistles of Paul and the writings of the Apostolic Fathers.

The historical existence of Jesus though controverted by a few critics of the late 19th cent. is now almost universally admitted even by those most bitterly opposed to Christian teaching. According to the sources already mentioned He was born at Bethlehem near Jerusalem in the reign

long by 6 m broad, and has an area of 16 sq m. St Helier is the chief town, and the coast is fretted with rocks and cliffs. There are fine stretches of sand and beautiful inland scenery. The island is a popular holiday resort. At the extreme S W stands Corbière lighthouse. Pop (1931) 50,462.

Jersey City, city of the State of New Jersey, U.S.A. It is practically a suburb of New York, from which it is separated by the Hudson River. It is an important railway centre, and has large docks. There are several

Church of the Holy Sepulchre, said to be built over the site of the tomb in which Jesus was buried after His crucifixion, the Mount of Olives, the Crusaders' Church of St. Anne; the Mosque of Omar, the Garden of Gethsemane, and the Western or Wailing Wall. Of the new buildings, the Hebrew University (which was opened by Lord Balfour in 1925) on Mount Scopus, the Anglican Cathedral, the Franciscan Basilica in Gethsemane, the Italian and various Jewish hospitals, the offices of the



A corner of the Wall of Jerusalem, dating from the 16th cent

sugar-refining, rubber, and tobacco factories, foundries, and breweries. Pop (1930) 316,715.

Jerusalem, capital of Palestine, and a Holy City of three Faiths—Judaism, Christianity, and Mohammedanism. It is a natural fortress, being set on a rocky plateau formed of two hills, and is situated c 37 m from the coast, and c. 17 m west of the Dead Sea. Jerusalem is bordered on E and W by valleys—that on the E, the Kidron Valley, separating the plateau from the Mount of Olives. Among the chief features of the City are the

Jewish Agency and the impressive Y M C A buildings (opened 1933) are the most noteworthy.

The history of Jerusalem has been stormy. The scene of many sieges, destroyed and desolated, it has passed from one conqueror to another on no less than six occasions. The walls, built by Solomon, were destroyed by Nebuchadnezzar (c 586 B.C.), and rebuilt by Nehemiah c 445 B.C. Upon the capture of the City by Antiochus Epiphanes (168 B.C.), Jerusalem suffered further desolation. At his accession (37 B.C.), Herod restored the city

and on the fall in gold values. Jevons was author of *Theory of Political Economy* (1871) *The State in Relation to Labour* (1887) and *Principles of Science* (1874). His *Elementary Lessons on Logic* (1870) was formerly very well known.

Jew The Wandering, mediæval legendary figure who having insulted Christ as He carried the Cross to Calvary was told he must wait on earth until He should come again. He bears various names and has been identified with a door keeper in the palace of Pilate as the carpenter who made the Cross and with a shoemaker who refused to allow Jesus to rest on his bench. He has been seen at all ages of history and many stories, poems and plays have been written about him, the earliest extant being that of Matthew Paris who in his *Chronicles* (c. 1230) gives an account of a legend.

Jewel, John (15th–1671) English Divine. Disciple of Peter Martyr he fled from England in 1554 suspected of having Protestant tendencies. He returned however on Elizabeth's accession and amongst his many activities at this time was his challenge to the Romanists contained in his *Splendour Ecclesiæ Anglicanæ*. He hereafter was regarded as an authority on the subject being consulted by the government. In 1660 he was made Bishop of Salisbury and at his death was buried in the Cathedral.

Jewellery personal ornaments of value, stones and metal. The wearing of jewellery probably originated from man's instinct to carry his wealth on his body which in ancient times was the safest method of keeping it. Buckets were unknown, so rings and bangles were invented. Later came the desire to add ornamentation for its own sake and so evolved the first ornaments of Jewellery. In the Bronze Age rings, armlets, pendants and brooches were worn. Sometimes ear-rings also were worn and necklaces were by no means wanting. But we have been told many necklaces were of

beads and the standard of workmanship was sometimes astonishingly high. Egypt and Assyria had meanwhile developed jewellery to a much higher level. Gold beating for instance was a process in which the Egyptians were experts and tombs have revealed that they were also skilful enamellers. Their fine stone-cutting is attested by the many scarabs of jasper or porcelain existing to-day which were mounted in rings and various other settings. One of the two best collections of Egyptian jewellery is in the British Museum.



The world famous Canning Jewel. Many of these are in the collection of the British Museum.

where many wonderful examples of this art may be seen. Here are also some beautiful pieces of Egyptian ornament carved and chased with the greatest sensitiveness and skill. The ancient Greeks excelled in intaglio work and gem-cutting, jewels being extremely adapted to beating and shaping in gold.

One of the most individual and striking types of antique jewellery was produced by the Celts, whose art is seen at its most typical in the penannular brooch which had a pin with a large head worn pointing upwards.

of the Roman Emperor Tiberius His mother, Mary, is represented by Christian theology as having conceived Him by the influence of the Holy Ghost (*qv*), though He was considered by His contemporaries as the child of Joseph, a carpenter, and Mary's spouse His parents' home was at Nazareth in Galilee, and, save for the facts that soon after His birth He was taken to Egypt to escape the machinations of Herod, and that at the age of 12 He was presented by His mother in the Temple at Jerusalem, nothing is known of His early life He was baptised, probably about A D 26, by John the Baptist (*qv*), and began His public career of preaching, healing the sick, and instructing a small group of close personal followers who appear to have been mostly members of the lower middle class of Palestinian society—fishermen, tax-gatherers, etc

His teaching was interpreted by the Jewish priestly class as inimical to established institutions, and by the treachery of a disciple, Judas Iscariot, He was betrayed to the Jewish authorities and by them sent before the Roman governor, Pontius Pilate (*qv*) This probably took place in A D 29 when He was about the age of thirty-three On the 3rd day after His crucifixion certain of His immediate followers found His tomb untenanted, and believed that He had risen from the dead, a belief based on their interpretation of certain predictions which He Himself had made, and strengthened by reports that some of their number on various occasions during the 40 days immediately following had seen and conversed with Him On the 40th day after His resurrection the New Testament represents Him as ascending to Heaven in bodily shape from the Mount of Olives, a hill near Jerusalem See also CHRISTIANITY

SEE FURTHER *The New Testament*, Ernest Renan, *La Vie de Jésus*, Rt Rev C Gore, *Jesus of Nazareth*

Jesus, Society of, a Roman Catholic Order founded in 1539 by Ignatius of Loyola (*qv*), the members of which are

commonly called Jesuits Their official title is Clerks Regulars of the Society of Jesus The Order was organised on military lines, and upon its confirmation by Pope Paul III in 1540, Ignatius became its first General The Society went through many vicissitudes, but its influence spread rapidly, and houses were established for the special purpose of training its members, who are divided into four grades (1) Novices, (2) Scholastics, (3) Coadjutors; and (4) Professed The training is long, thorough, and of extreme severity, the most important feature is the breaking of the novice's personal will which prepares him to be a fit instrument for the will of the Society The Order has produced many great scholars and men of considerable administrative power, but the members of the Society have been accused of involving themselves in political plots and intrigues, and have at various times been expelled from many countries

Jet, a hard, black, dense kind of lignite or fossil wood, capable of being highly polished and easily cut into ornamental shapes It was used for ornaments in Switzerland and Belgium in Palæolithic times, and jet beads have been found in Bronze Age barrows in England, being probably worn as talismans Jet occurs in the Lower Lias beds of W Dorset, but the source of supply in this country has always been from the Upper Lias of Whitby

Jet Condenser, see CONDENSER, THERMAL

Jetsam, see FLOTSAM

Jevons, William Stanley (1835–1882), English economist and logician He was assayer to the mint, Sydney, 1854–9, became Professor of Economics and Philosophy at Owens College, Manchester (1866), and of Economics at University College, London, in 1876 He expounded the theory of utility, the alleged relation between commercial crises and sun-spots, and, in a new form, Whewell's theory of inductive logic He wrote (1865) on the danger of the British coal supply being exhausted,

and on the fall in gold values. Jevons was author of *Theory of Political Economy* (1871) *The State in Relation to Labour* (1887) and *Principles of Science* (1874). His *Elementary Lessons on Logic* (1870) was formerly very well known.

Jew The Wandering medieval legendary figure who having insulted Christ as He carried the Cross to Calvary was told he must wait on earth until He should come again. He bears various names and has been identified with a door keeper in the palace of Pilate as the carpenter who made the Cross and with a shoemaker who refused to allow Jesus to rest on his bench. He has been seen at all ages of history and many stories, poems and plays have been written about him, the earliest extant being that of Matthew Paris who in his *Chronicles* (c. 130) gives an account of the legend.

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This world famous Carving Jewels example of the Carving Jewels

where many wonderful examples of this art may be seen. Here are also some beautiful pieces of Assyrian ornament carved and chased with the greatest sensitiveness and skill. The ancient Greeks excelled in intaglio work and gem-cutting besides being extremely adept in beating and shaping gold.

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discouragement of everything not reconcilable with the grey Puritanism of the time so that the jewellers art languished. By the beginning of the 18th cent however it was flourishing again and later exhibited some of the extravagance and over-elaboration which characterised the dress of the period.

French influence was marked in intricate pendants rings and brooches. Enamelling was very popular. Locketts containing miniature portraits were



Cap of St. t. from the Summer Palace P. k.
The cap Chin. is silver gilt. The work is marked
in the sign of human figures and is
ornate. The design is with the sign of the P.

introduced and Wedgwood cameos were worn in brooches and ear rings.

Semi-precious stones were in demand for use in the manufacture of cheaper articles, a feature of the 18th cent industrialism which affected jewellery along with everything else. Fine diamonds and pearls expressed the new prosperity.

Improvement in setting and a greater originality in design marked the work of the jewellers early in this century. The matching and contrasting of jewels became a subtle and delicate art with

platinum as a setting for diamonds instead of gold. Many fine designs essentially simple and clean cut are seen in modern jewels whose rectangular shapes are far removed from the fussy styles of former years.

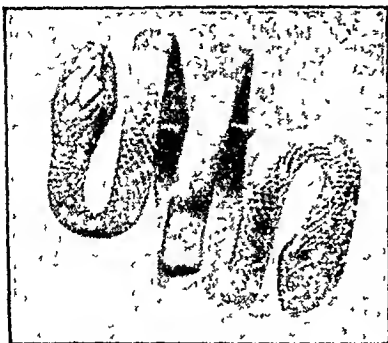
Jewish Calendar. The, is luni solar that is to say the year is solar and the months are lunar. In a cycle of 19 years the 1st and 4th 5th 6th 9th 10th 11th 13th 15th 16th and 18th years have 12 months and the remaining years 13 months of 9 or 30 days each. The length of the ordinary year may be 353 354 or 355 days and that of the leap year 383 384 or 385 days thus the mean length of the year over a 19 year cycle is just over 365 days. The following are the names of the months and the most important days of the year. *Tishri* 1 and 2 *Nisan* Year 10 *Yom Kippur* (Day of Atonement) *Nisan* 14-15 *Purim* (14-15 *Adar* the month intercalated in leap years) *Nisan* 14-15 *Passover* *Nisan* 6 and 7 *Pentecost* *Tammuz* 4b *Lil* 1.

The years are reckoned from the creation of the world the date of which is taken to be 3 600 B.C. Thus the year A.D. 1934 is A.M. (Anno Mundi) 5694-95. The day begins at sunset for the purpose of observing the Sabbath and the various feasts and fasts. The time is in hours and minutes in advance of Greenwich time being that of the meridian of Jerusalem. See also **CALENDAR**.

Jewish Literature see **HEBREW LITERATURE**.

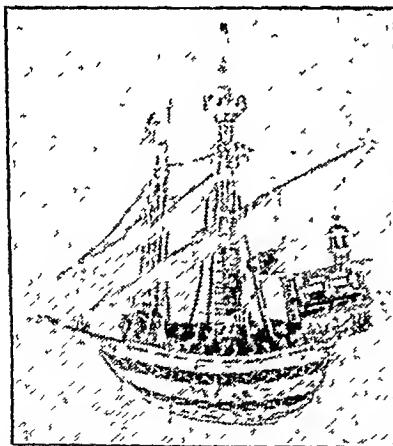
Jews, the name applied to members of the Hebrew race. In consequence of the fact that membership of the race generally coincides with adherence to the Jewish faith (see **JUDAISM**) the term has come to have both a racial and religious significance. The word Jew is of comparatively late date in the history of the Jewish people. It is derived from the Hebrew *Yehudi* meaning Judean or member of the tribe of Judah. With the for-

The brooch is common among the relics of Roman jewellery, many of which have been found in England. Most



Roman Bracelet

are fashioned of bronze and some of iron, less elaborate in design than the Celtic jewellery, and less delicate in craftsmanship than the Greek. The Romans also wore jewelled finger- and



German gold enamelled jewel, 16th cent., in the form of a two masted vessel, with white reefed sails, numerous figures rowing and, on either side, a figure climbing a ladder

ear-rings, gold hair-fillets, jewelled pins and bracelets. Discoveries of the jewellery of the succeeding Anglo-

Saxon period include rings, brooches, shield bosses, crosses, buckles, beads, made from gold, silver, and bronze, and frequently enamelled. A feature of the Anglo-Saxon jewellery is the functional nature of many of the relics, such as shields and sword hilts. In early mediæval times the jeweller's art was practised in the monasteries, which led to its introduction for religious purposes. The religious participation of the times was also reflected in the adorning of personal jewellery with devotional designs, which



Manchu Lady's Headdress

the vestments of the clergy and the raiment of the nobility were adorned with jewels.

During the Renaissance more elaborate design and intricate workmanship characterised the jewellery. Among the most original ornaments were pendants, whose main feature might be a baroque pearl, whose irregular shape would suggest a rounding design to give the effect of some animal, such as a bird or a fish. The devotional pendant, or reliquary, was a favourite article of jewellery until the Reformation. In England the Puritan reaction resulted in a

a distinctive Jewish civilisation which found expression in the Babylonian Talmud (qv) and a political autonomy in some periods little removed from independence. In the W Jews had formed vast communities in Egypt c. 200 B.C. and by the 2nd cent. A.D. Jewish communities were to be found scattered throughout the length and breadth of the Roman Empire. As citizens of the Empire Jews generally enjoyed full rights and it was not until the emergence of Christianity as a political force that the persecutions which form so tragic a feature of later Jewish history appear. Under Christian rule Jews experienced varying vicissitudes of fortune; there developed a series of legal enactments which debarrd Jews from taking part in trades and agriculture and restricted them to such employments as usury and the business of old clothes which naturally brought them into disfavour and contempt.

The Renaissance and the Reformation produced important changes. The revival of learning led to a great interest in Jewish literature and intellectual life, and a tendency to regard the Jews with greater humanity. The Reformation inasmuch as it abolished the political domination of the Papacy in important parts of Europe at the same time provided the Jews with new places of refuge from the Inquisition (qv) and with centres such as the Netherlands, Germany and England in which they could live without being subjected to many of the older restrictions.

The changes of the 18th and 19th cents. affected the Jews in much the same way as the people amongst whom they lived, although their emancipation and enjoyment of equal rights were in many countries long delayed. In the main rights were only granted them after persistent agitation supported by enlightened public opinion. The end of the 19th cent. saw the Jews enjoying equal rights and taking their share in all forms of public life. Only in Rumania, the Russian Empire and in remote areas such as

Persia and Arabia were Jews still subject to discrimination (*but see* ANTI-SEMITISM).

Following the World War the development of extreme nationalism in many parts of the world again began to prejudice the rights of Jews. In some countries such as Poland the tendency on the part of the State to establish trade and manufacturing monopolies has been directed against Jews. The most serious development of anti-Jewish policy has been experienced in Germany. Here the National Socialists had for years propagated a policy of Jewish exclusion and suppression. On their advent to power (March 1933) serious excesses occurred against Jews and machinery of the new Government was directed towards expelling all Jews from the public services and many from universities, trades and professions.

What is widely regarded as the most important Jewish political development during the past 1000 years was the creation of the Zionist movement (*see* ZIONISM) in 1897 by Theodor Herzl (qv). This aimed at the political, economic and cultural reconstruction of the Jewish nation through their resettlement in Palestine in sufficiently large numbers and over sufficiently wide areas to secure their fruitful and peaceful existence as a nation.

The Jewish population of the world was in 1932 variously estimated at 13-17 millions.

Jew's Ear edible brown gelatinous fungus growing usually on elder trees.

Jew's Harp, a toy which produces a vaguely musical sound through the vibration of a metal tongue.

Jex Blake Sophia (1840-1910) British physician disallowed a medical degree because she was a woman. She was determined to remove this ban and established the London School of Medicine for Women eventually securing their entry into the profession.

Jezreelites, the followers of James Jershom Jezreel, a name assumed by James White (1840-1885). Jezreel founded the *New and Latter House of*

mation of the kingdom of Judah, the term came to be applied to S Palestine, which included other tribes who regarded Jerusalem as their centre. Later, with the destruction of the N kingdom of Israel, its application was extended until it came to include the remnants of the N tribes which were gradually fused, under the centralising influences of the Second Temple and the reformation of Ezra, into a unified nation.

The origin of the Jewish people is obscure. It is early met with under the name of "Israel" and "Hebrew." It would appear that the term "Israel" was a comprehensive national name meant to apply to all the tribes as a whole, the term "Hebrew," however, is regarded as geographical and derived from the Hebrew word *Lber*, "beyond"—meaning the people beyond the river. It was used in connection with Abraham, whose migration from Ur in Mesopotamia to Canaan is described in the Bible.

For the early history of the Jews we are mainly dependent on the Biblical narrative, supplemented with important archaeological documents which have been brought to light during the past century. Biblical tradition relates that the Hebrews migrated to Palestine from "beyond the river." A cycle of famines later compelled them to move into Egypt. Here a prolonged settlement was eventually terminated by a return across the Sinaitic peninsula to Canaan, which they largely reconquered and settled. In Palestine the loosely confederated tribes evolved into a monarchy under David (c 1000 B.C.) which subsequently split up into N and S kingdoms. The later history was a succession of wars between N and S interspersed with invasion by the Egyptians in the S and the Syrians and Assyrians in the N. The coastal plain of Palestine provided a convenient highway to the rival armies of Assyria and Egypt, between whom Palestine became a buffer subjected to almost continuous attacks. Finally, c 750-722 B.C., the N kingdom

collapsed before an Assyrian and many of its inhabitants were deported into Syria. Though the kingdom survived for some time, relying on an alliance with Babylon, it finally fell before the Babylonians, and many of its inhabitants were taken into captivity.

When Cyrus, King of Persia, destroyed the power of Babylon, the Jews were permitted to return to Palestine. The Jewish State was re-established, but more as a religious community than a political one, dependent on Persia, and gave place to high-priests. When independence was gone, Greek independence succeeded Persia and Greece. Both left their mark on Jewish thought and customs. Three rebellions under the Maccabees marked this period, a series of rebellions under the Maccabees beginning of the dispersion, rise of Christianity from Judaism. Jewish State was subject to suzerainty, but the Jews desired independence, and made efforts to achieve it. The Maccabees associated with the name of the Maccabees broke out in the 2 B.C., it was successful at first, an alliance with Rome. Pompey captured Jerusalem, Roman domination began, brought peace, and under a Herod the Great (d 4 B.C.) peace. But later tyranny goaded the Jews and in 67 B.C. another great revolt broke out. A hopeless struggle ended in the total extinction of the Jewish State.

Political independence gave place to religious development, endeavour to preserve the Jewish means of a system of religious personal legislation to which members of the race were to adhere. The whole of the Diaspora. Schools sprang up in Palestine, Babylonia, which now became the centre of Jewish activity. Descendants of the original exiles appear to have mingled with immigrants following the extinction of the Jewish State and to have

injury and is therefore forced to acknowledge defeat.

Joseph (1831-1907) Hungarian interpreter of classical violin such as the Beethoven and concertos and leader of the Joachim Quartette. His own composition is the *Hungarian Concerto*.

John of Floris (c 1145-1207) mystic who became a Cistercian and eventually the abbot of a monastery. He preached the beginning of a new Christian religion under the Holy Ghost and influenced the contemporary artists.

John of Arc, Saint (1412-1419) saint and patriot born at Domremy on the Meuse of peasant parents. She dreamed of driving the English invaders and their allies out of France and succeeded in her attempt to lift the Dauphin. Dressed in black she fought with the army in the relief of Orleans and drove off the English. The French army had successes in the weeks following. In July 1429 the Dauphin was crowned King at Reims. He made Joan with Burgundy. In 1430 Joan successfully defended Compiègne against the Burgundians and was captured. The English brought her to London. She was charged with heresy and was burned at the stake. The English brought her to London. She was charged with heresy and was burned at the stake.

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Book of Job, a book of the Bible which deals in allegorical form the question of suffering. Job is an upright, prosperous and happy man who was permitted by God to be tested by Satan and one day after another overtook

him. He was tempted to renounce God and die, but he did not. Instead he retired to a quiet place and sat in ashes. Here his friends Eliphaz, Bildad and Zophar visited him. The debate amongst the four occupies a large part of the book which in form is strongly reminiscent of Greek tragedy. See A. S. F. A. K. Job 1904. Kallen's *Book of Job as Greek Tragedy* (1918).

Jobber see STOCK EXCHANGE

Job's Tears, hard white, heath-like of an Asiatic grass (*Coxis lacrymifera*) old as beads or sometimes the grass itself.

Joasta, in classical legend the wife of Laius king of Thebes. She married her son Oedipus ignorant of his identity and committed suicide when she discovered her mistake. See the *Oedipus Tyrannus* of Sophocles.

Jodhpur (or Marwar) (1) Large state in the Rajputana Agency, British India. Area 35,000 sq. m. It consists of a sandy plain crossed by the R. Luni. Wheat and barley are grown extensively. Other crops include millet and pulses. Salt is produced. Marble obtained from the Makrana quarries. Amongst the manufactures are leather and brass work. Pop. (1931) 215,900. (?) City and capital of above founded 15th cent. The city contains many palaces and town residences besides temples. The chief manufactures are metal ware and cotton. Pop. (1931) 3,600.

Joel the second of the Minor Prophets in the Old Testament. His book deals with the great and terrible day of the Lord and was probably written c. 600 B.C. The immediate occasion for the prophecy was a plague of drought and locusts. Joel exhorts the people to fast and pray to avert the calamity that threatens them. See S. R. Driver *Joel and Amos* (1897) in the *Cambridge Bible*.

Joffre, Joseph Jacques Césaire (1852-1931) marshal of France born at Nîmes on the Spanish border of Spanish ancestry. He took part in the

Israel in 1876 He professed to be the messenger of God, and to have received Divine revelations He established the headquarters of his sect at Gillingham, Kent, where his followers lived a communal life Upon his death there was a division in the sect, a few adherents of which still exist

Jhansi (1) A district in the United Provinces, British India, forming part of British Bundelkhand Area, 3630 sq m The three chief rivers are the Betwa, Dhasan, and Pahuj, the principal crops are cereals and cotton Pop 620,000

(2) City, capital of above, an important railway centre, about 60 m from Gwalior Jhansi played an important part in the Indian Mutiny Pop (1931) 66,432

Jhelum (or *Jehlam*) (1) A district in the Punjab, British India Area, 2770 sq m It is crossed E-W by the Salt Range, and by the R Jhelum Salt is quarried, and there are coal-mines The chief products are oil, seeds, and cereals Pop c 500,000

(2) Town and capital of above, situated on the R Jhelum It is a modern town, and is the main trading centre Boat-building is the principal occupation Pop 18,060

(3) One of the five rivers of the Punjab, British India, the *Hydaspes* of the Greeks, 450 m long, in its neighbourhood Alexander the Great overcame the native King Porus, 327 B C

Jib, see YACHTING

Jibuti (or *Jibouti*, *Djibouti*), capital and chief port of French Somaliland, on the Gulf of Aden It is the terminus of the railway to Abyssinia Pop (1931) 11,396

Jig. (1) A lively dance, also a kind of entertainment in rhymed verse, partly sung and partly recited by a clown, accompanied by a pipe and tabor (2) A word used in two principal senses in technology, one being a device used in ore dressing (*qv*), and the other an apparatus for holding a part upon which some machine operation is to be performed, such as

drilling The object of the device is to enable the same operation to be repeated with great exactness on a large number of like parts, for example, castings or stampings

Jigger, see FLEAS

Jingoism, unbalanced patriotism, a word originally used in 1877, at the time of the British fleet being sent to the Dardanelles, which foiled Russian designs on Constantinople The word was taken from a topical song by W Hunt, and sung by G H Macdermott, the chorus of which ran

"We don't want to fight,
But by Jingo! if we do,
We've got the ships, we've got the men,

We've got the money too"

Those who advocated war were known as Jingoists A hypothetical derivation of the phrase "by Jingo" is from the Persian *jang*, war See also CHAUVINISM

Jinn (or *Djinn*), figure in Arabian folk-lore akin to fairies (*qv*) and ogres

Jiu-jitsu (or *Ju-jitsu*), a Japanese system of attack and defence, based on a form of physical culture, combined with a knowledge of anatomy, enabling the expert to attack the weakest and most sensitive parts of his adversary's body Originally practised exclusively by the *samurai*, the feudal military caste of Japan, jiu-jitsu is now taught in schools and colleges in that country, and practised by all classes It includes a large number of disabling grips, and also blows struck with the edge of the hand at sensitive nerve centres, such as the arm-pit, or the side of the neck In defence the jiu-jitsuist invariably gives way before an attack, allowing the attacker's own impetus to throw him off his balance, and give an opening for a disabling hold. Skill at jiu-jitsu does not demand muscular strength, and it thus has the advantage of neutralising physical differences between combatants A friendly bout continues till one of the combatants succeeds in securing such a hold that his opponent cannot continue without

risk of injury and is therefore forced to acknowledge defeat

Joachim, Joseph (1831-1907) Hungarian interpreter of classical violin works such as the Beethoven and Brahms concertos and leader of the famous Joachim Quartette His best known composition is the *Hungarian Concerto*

Joachim of Floris (c 1145-1200) Italian mystic who became a Cistercian monk and eventually the abbot of a monastery in 1177 He preached the immediate beginning of a new Christian dispensation under the Holy Ghost and greatly influenced the contemporary Franciscans

Joan of Arc, Saint (1412-1431) French saint and patriot born at Domrémy on the Meuse of peasant parentage She dreamed of driving away the English invaders and their Burgundian allies out of France and succeeded in her attempt to visit the Dauphin Dressed in black armour she fought with the army in the relief of Orleans and drove off the English The French army had minor successes in the weeks following and in July 1429 the Dauphin was crowned King at Rheims He made a truce with Burgundy In 1430 Joan unsuccessfully defended Compègne against the Burgundians and was captured The English brought her and handed her over to the Church for trial as a heretic As such she was tried by Cauchon Bishop of Beauvais and condemned She refused to recant as that meant life long imprisonment and was burnt at the stake by the English at Rouen May 30 1431 In 1456 the Pope annulled the judgment Beatified in 1809 Joan was canonised in 1913 She is a patron saint of France and her feast in May is the occasion of national rejoicings

Job Book of, a book of the Bible (qv) which deals in allegorical form with the question of suffering Job was an upright prosperous and happy man, who was permitted by God to be severely tested by Satan and one misfortune after another overtook

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Job's Tears hard white sheaths of an Asiatic grass (*Cort. lacryma Jobi*) sold as beads or sometimes the grass itself

Jocasta, in classical legend the wife of Laius King of Thebes She married her son Oedipus ignorant of his identity and committed suicide when she discovered her mistake See the *Oedipus Tyrannus* of Sophocles

Jodhpur (or Mewar) (1) Largest State in the Rajputana Agency British India Ar 35 000 sq m It consists of a sandy plain crossed by the R Luni Wheat and barley are grown extensively other crops include millet and pulses Salt is produced Marble is obtained from the Makrana quarries Amongst the manufactures are leather and brass work silk and cotton goods Pop (1931)

1 900 (?) City and capital of above founded 15th cent The city contains many palaces and town residences besides temple The chief manufacture are metal ware and cotton Pop (1931) 73 500

Joel, the second of the Minor Prophets in the Old Testament His book deals with the great and terrible day of the Lord and was probably written c 500 B.C. The immediate occasion for the prophecy was a plague of drought and locusts Joel exhorts the people to fast and pray to avert the calamity that threatens them See S R Driver *Joel and Amos* (189) in the *Cambridge Bible*

Joffre Joseph Jacques Césaire (1850-1931) marshal of France born at Rivesaltes on the Spanish border of Spanish ancestry He took part in the

defence of Paris (1870) and later became a military engineer, specialising in fortification. He was appointed captain (1876) and was transferred to Indo-China (1885) at his own request. He built a railway in Senegal (1892), and occupied Timbuctoo (1894) after the murder of Col. Bonnier. He was appointed general of brigade in 1900, general of division (1905) and member of the War Council (1910). On the outbreak of the World War (1914) he was appointed Commander-in-Chief and conducted the French operations until he was replaced by Nivelle at the end of 1916. He was intolerant of incursions upon his authority, and much of the opposition against him was due to his acting independently of the Government.

Johannesburg, the most important commercial city and mining centre of the Transvaal, S. Africa, c. 960 m. from Cape Town, founded in 1886. Situated in the Witwatersrand gold-fields, it has developed with remarkable rapidity. The city is well laid out. Buildings of note are the Government Offices, the University of Witwatersrand, the Stock Exchange, the Observatory, the most important in S. Africa, and the Zoological gardens. Johannesburg is also an important railway centre. The famous mines lie to the S-E and W of the city, extending to a distance of 50 m. along the veldt. Besides mining, the principal industries include brewing, printing, brass, and iron founding, tobacco, and furniture. European pop. (1931) 203,300.

John the Apostle, St., son of Zebedee and brother of James. He was originally a fisherman on the Lake of Galilee, and is represented in the Gospels as a member of the innermost circle of Christ's followers. He accompanied his Master on such special occasions as the Transfiguration and the Agony in the Garden of Gethsemane. Tradition relates that after the crucifixion of Jesus John went to Ephesus, where Mary the mother of Jesus resided with him until her death.

He is represented by tradition as the only one of the Apostles to die a natural death, at the age of c. 100. His feast day is Dec. 27.

John the Baptist (1st cent. A.D.), Hebrew prophet referred to in the New Testament, where he is represented as the forerunner of Christ, whom he baptised. After having been imprisoned in the fortress of Machærus, on the Dead Sea, for offending Herod, he was beheaded c. A.D. 28. The feast of his birthday is kept in the Christian Churches on June 24.

John (1176-1216), youngest son of Henry II, became king of England on the death of Richard I in 1199, inheriting from his brother a kingdom misgoverned for over 10 years. He brought about disaster by playing the part of a weak, undiplomatic man trying to be strong. In his quarrel with the barons who objected to the payment of feudal dues, he lost, and was forced to sign Magna Carta (q.v.) (1215). But the more extreme barons obtained the upper hand, and in the ensuing Civil War, John showed the qualities of a capable general. He died in 1216.

John, Kings of France

JOHN I (b. and d. 1310), posthumous son of Louis X, is supposed to have been murdered by his uncle, Philip V. **JOHN II** (1319-1364), "John the Good," ascended the throne in 1350. He was taken prisoner at Poitiers (1356) in the war with England. Freed in 1360 at the Peace of Brétigny, he returned to England in 1361, having been unable to raise money for his ransom, and died there.

John (1624-1696), King of Poland. Usually known as John Sobieski, he was a son of James Sobieski of Cracow. In 1672 Poland ceded the Ukraine to Turkey, but John defeated the Turks and the cession was cancelled. In 1673 he was elected king. His best-known feat was the relief of Vienna, besieged by the Turks, 1683. The last years of his life were marred by military failure and the intrigues of his wife.

John (1296-1346), King of Bohemia

from 1311. He fought in wars all over Europe trying to increase his power. Becoming blind in 1340 he continued his amazing military and political activity. He was killed at Crécy in 1346. His supposed badge the three feathers and his motto *Ich dien* were adopted by the Prince of Wales after that battle and have since been the badge and motto of the Princes of Wales.

John, Augustus Edwin (b. 1879) English painter a native of Tenby. He studied at the Slade School and was for many years an exhibitor and leading member of the New English Art Club. In 1911 he was elected A.R.A. and 7 years later became a full academician.

John's work had for some time a considerable influence on many of the younger school of British painters among whom he found many imitators. Examples of his early style are *The Way Down to the Sea* (1906) and *The Smiling Woman* (1910)—decorative compositions with flat masses of strong colour. During and after the War he painted a large number of portraits of prominent men including Lloyd George, Lord Fisher and Bernard Shaw. Specimens of his work hang in the Tate Gallery including portraits of Col. T. E. Lawrence and Madame Suggia and he is well represented in provincial and colonial collections. The British Museum has examples of his drawings and etchings.

John, Don (1547–1678) of Austria illegitimate son of the emperor Charles V fought against the Turks and Moors. He defeated the Turkish fleet at Lepanto. In 1576 he became Governor General of the Netherlands dying there of fever. The younger Don John (1609–1679) illegitimate son of Philip IV of Spain had a distinguished military career.

John, Epistles of, three canonical writings attributed to the Apostle John. The first epistle is notable for the similarity of its style with that of the Fourth Gospel, stresses the idea of Divine

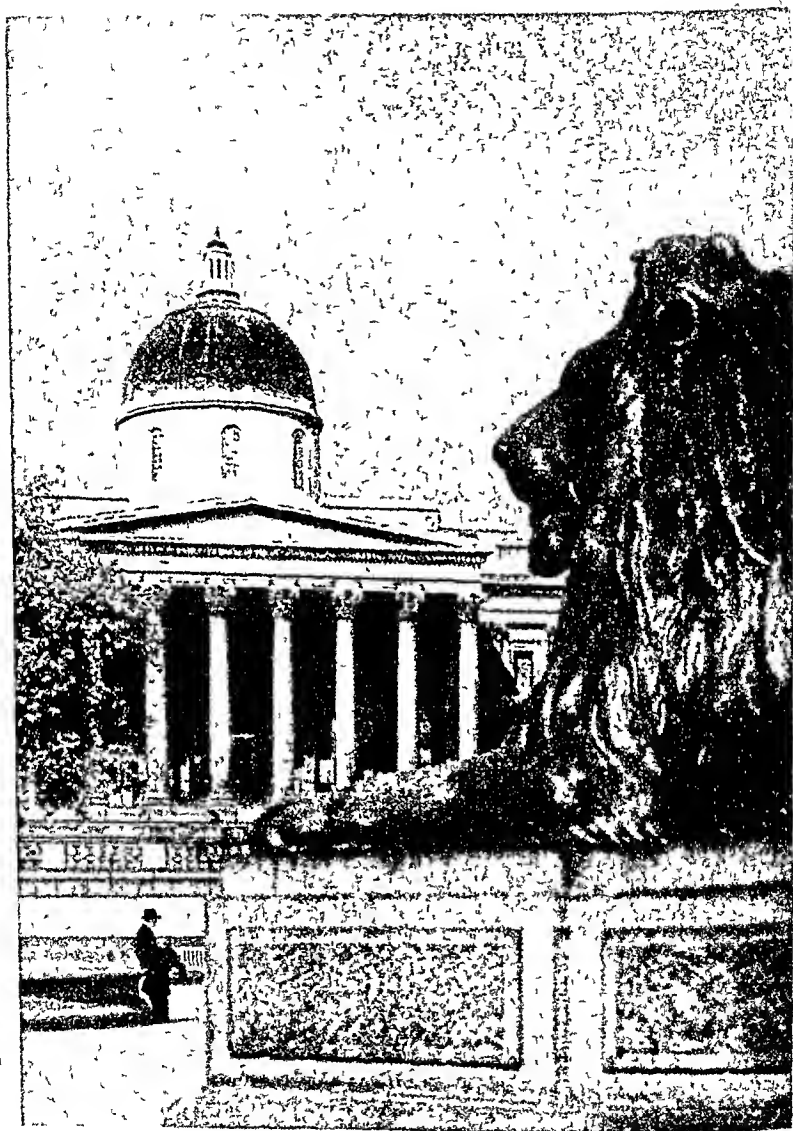
forth in simple style and the statements show that the writer was a logical thinker.

The short second epistle also dwells upon the virtue of love but there is a more intimate quality about the teaching which distinguishes it from the first epistle.

In the third epistle the writer warns the reader against self-willed and self-assertive people who are given to interpreting the truth in their own way and stresses the importance of adhering to the truth as revealed by God. Modern criticism gravely questions the attribution of the epistles to the Apostle John though most writers consider that the first at least was written by the same author as the Fourth Gospel.

John, Gospel of St. the Fourth Gospel of the New Testament written so tradition holds by John the Apostle the son of Zebedee at Ephesus between A.D. 90 and 110. The gospel gives a view of Jesus in marked contrast to that of the three other gospels (John xx 30–31) and dwells on aspects of the life and teaching of Jesus which they neglect. Although it is generally agreed that the gospel possesses valuable historical elements there is a divergence of opinion as to whether the author was an actual eye-witness or whether his account is rather to be read as a spiritualised meditation upon the actual facts of Jesus's life. If the latter view is held it must still be a source of wonder that so detailed a knowledge of the life and customs of Palestine and so intimate a picture of our Lord's life could have been written with such conviction of style. The problem of the authorship of the Fourth Gospel is one of the most fascinating of literary mysteries.

John, Sir William Goscombe (b. 1860) British sculptor has executed a number of public monuments. He studied at the Royal Academy where he won a gold medal and a travelling scholarship which took him to Paris in 1890. He became A.R.A. in 1898, R.A. in 1909 and was knighted in 1911.



LONDON THE NATIONAL GALLERY, TRAFALGAR SQUARE

Johnson, Hiram Warren (b 1866) American politician. He attended the University of California became a reporter studied law and was admitted to the Bar in 1888. As prosecuting attorney he combated public dishonesty and graft (1906-7) was elected Governor of California (1911-13) but was defeated in the election for the Vice Presidency (1912). He became a Senator in 1915 and opposed President Wilson's European intervention being antagonistic to the League of Nations.

Johnson, General Hugh S (b 1889) American soldier lawyer and business man who first came into public prominence as chief administrator of the National Industrial Recovery Act promulgated in 1933 by President Roosevelt. He graduated in military science and law and became Brigadier-General in 1918. After retirement from the Army in 1918 he entered business life. His work under President Roosevelt proved his vigour and determination.

Johnson, John Arthur (Jack Johnson b 1874) negro boxer won world's heavyweight championship from Tommy Burns (1908) defeated the ex-champion Jim Jeffries at Reno USA 1910 lost title to Jess Willard at Havana 1915.

Johnson, Lionel Pigot (1867-1909) English poet and critic connected with the Yellow Book group. His *Art of Thomas Hardy* (1894) and *Ireland and other Poems* (1897) are his best known works.

Johnson, Samuel (1709-1784) English author and conversationalist was the son of a bookseller at Lichfield. He married Mrs Elizabeth Porter (1735) and opened a school at Fordal at which (which was a pupil) came to London in 1737 and worked as a journalist and bookseller's hack but the publication of *Jess* an imitation of one of Juvenal's satires (1739) and his *Life of Savage* (1744) established his reputation. In 1747 he was producing his famous *Dissertation on the Liberty of Human*

Wishes a didactic poem and *Irene* a tragedy appeared in 1749. In 1750 he founded the *Rimble* a bi-weekly journal which became very popular. In Feb 1755 he wrote his famous letter to Lord Chesterfield who had neglected his duty as a patron to recommend John on a *Dictionary* and who now that Johnson was known and did not want it had begun to remedy his default. *Rasselas* (1759) a sort of philosophical romance and his *Lives of English Poets* his greatest work (1790-81) followed. In 1775 he published his account of the *Journey to the Hebrides* which he had taken with Boswell during 1773. The except for his *Prayers and Meditation* (published 1780) was his last work. Johnson's prose style became the model for many writers.

In 1764 the Literary Club had been formed. Johnson presided and Burke, Beaumont, Boswell, Fox, Garrick, Gibbon, Hawkins, Langton, Sir Joshua Reynolds and Adam Smith were members. The discussion of every subject with Johnson's weighty decisions on matters ranging from the Cock Lane Ghost to the curious poem of Ossian, that took place among the members and at the house of the Thrales were set down in detail by Boswell in the *Life* which has immortalised Johnson.

Johnson, Thomas, was an English designer and carver of furniture who lived in the 18th cent. His work is an extreme example of the rococo style highly ornamental and showing a mixture of Catholic ideas with those of the Louis Quatorze period and with adaptations from the Chinese.

Johnston, Alexander Keith (1804-1881) Scottish geographer. After producing the *Natural History of Geography* he was appointed in 1843 Geographical Royal for Scotland. He was the pioneer of the study of physical geography in this country and in 1849 produced a *Physical Atlas of the World*.

Johnston, Sir Harry Hamilton (1828-1907) British administrative and ex-

plorer, studied painting, architecture, and languages, and travelled in Europe and Northern Africa. He concluded treaties with native chiefs for the British East Africa Company. He became Vice-Consul in Cameroon (1885). He declared a protectorate over Nyasaland in 1890, aiming at a belt of British influence from the Cape to Cairo. He was Commissioner and Consul-General in British Central Africa in 1891, was transferred to Tunisia in 1897, and back to Uganda in 1899. He received honours in many fields, including painting, zoology, and literature. Among his works is *The Opening-up of Africa*.

Johore (or *Johor*), an independent State situated at the S extremity of the Malay Peninsula. The surface is low-lying and covered with forest. The highest peak is Mount Ophir (3850 ft), whilst the most important river is the Muar. The capital town, Johor Bharu, is joined with Singapore and Penang by rail. Among the chief products are pepper, rubber, coffee, and timber.

A treaty of Dec., 1885, with the Sultan placed Johore under British protection, and in 1914 the ruler further agreed to the appointment of a British general adviser. In 1931 there were 6 English and 113 vernacular schools. Pop. (1931) 505,300.

Joint, in geology, a series of divisional planes or fractures found in most rocks, due sometimes to contraction of the rock through drying or other causes, and sometimes to strain during upheavals in the earth's crust. Joints exert an important effect in weathering by permitting the entry of water, and are lines along which the rock easily splits. Hence their importance in quarrying. Usually they are more or less at right angles to the bedding.

Joint Account, the conduct of business by two separate firms or individuals with an equal share in any resulting profit or loss. Joint accounts may be created for a specific transaction only, or, more usually, for general business between two firms at either

end of an important trade route. **Joint-firs**, a name given, on account of the leafless jointed stems, to plants of the family *Gnetaceæ*, which is close to the *Yew* family and to the *Coniferae* and contains the two genera *Gnetum* and *Ephedra*.

Joints in the human body are those structures which constitute articulations between the various bones. The three essentials of a joint are smooth movement, efficient transmission of weight and tension, and stability when stationary.

Not all joints are so simple as the knee joint, in which there is an articulation between only two bones. In many other joints, several bones and several articulations go to form the joint. In the wrist and in the foot the joint is a most complicated structure, while in the elbow, there are the ends of at least three bones which constitute the structure.

The joint is really a roughly cylindrical cavity which has at its two ends the articular cartilage of two bones, and has at its sides the joint capsule. The interior of the joint is filled with a clear fluid which acts as a lubricant. The ends of the two bones at the joint are not flat, but become shaped to serve the needs of the particular joint. The shoulder joint is ball and socket in construction. The shoulder blade or scapula forms a cup, into which the top of the upper-arm bone or humerus fits. The elbow is a hinge joint, and the articular surfaces have grooves to allow of "hinging" without side slipping. Some joints have within them plaques of cartilage which separate the two bone surfaces. Other joints contain ligamentous strands which serve to steady the cartilaginous discs. These are the internal ligaments. Joints also have other ligaments, where the capsule of the particular joint has become thickened in places which are subject to especial strain. Thus thickened, the capsule gives rise to the external ligaments. In many instances, the capsule is protruded and ballooned out, forming a separate

sa or fluid-containing pocket which
as a buffer to some near by struc-
re such as muscle tendons or other-
ne This is found in the case of
ost joints and some joints have
veral bursae connected with them.

Disorders of joints resulting from
olence are of common occurrence
he sprain often leads to pro-
nged trouble Dislocations are
perhaps less common but once they
ave taken place they are very liable
o recur When a joint such as the
nkle becomes sprained during the
course of a fall one or more of the
agamentous thickenings of the joint
capsule become torn If the joint is
put at rest this will usually undergo
repair and the joint will return to
normal If however the joint is not
allowed to rest the torn ligament under-
goes more tearing and the damage
is less easily mended When dislo-
cations occur the capsule of the joint is
torn The joint must be kept at rest
to prevent re tearing before the joint
is re set. Frequently an open opera-
tion for insertion of stitches in the torn
ligament is the only permanent remedy
to prevent recurrence of the dislocation

Joint-stock Company see COMPANY
JOINT STOCK

Joint Tenancy a tenancy which
comes into being when an estate is con-
veyed or devised to two or more per-
sons without any words to show that
they are to take distinct and separate
shares Its two characteristics are the
absolute unity between the tenants
that each has the right to an undivided
moiety of the whole and neither has the
right to any particular part and
secondly if one dies the other is
entitled to the whole Joint tenancy
can be severed by sale or partition
etc.

Jointure an estate settled by a
husband upon his wife to take the
place of dower (q v) It may be made
before or after marriage though it may
after she may waive it and claim her
dower

Joinville François Ferdinand Philippe
Louis Marie, Prince de (1818-1890) see

son of Louis Philippe
He became a king
(1836) brought
to France 1831

Tanger not
for what

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allegory of the swallowing-up of Israel by a great power, *i.e.* Babylon.

Jones, Daniel (b. 1881), Professor of Phonetics at University College, London, Secretary of the International Phonetic Association. His numerous publications include an *English Pronouncing Dictionary* and works on the pronunciation of French, Russian, Sinhalese, Sechuana, and Cantonese.

Jones, Ebenezer (1820-1860), English poet. His first work, *Studies of Sensation and Event* (1843), was not popular, and it was not until he was dying that he became known, for three poems, *Winter Hymn*, *When the World is Burning*, and *To Death*.

Jones, Ernest Charles (1819-1869), English political writer. Educated in Germany, he returned to England in 1838 and was called to the Bar in 1844. From 1845 onwards he devoted his life to Socialism, becoming a Chartist, for which he was imprisoned in 1848.

Jones, Henry (1831-1899), English author, wrote, under the name of "Cavendish," *The Laws and Principles of Whist Explained* (1862), the standard work on whist.

Jones, Henry Arthur (1851-1929), English dramatist. His first great success, *The Silver King*, was produced by Wilson Barrett in 1882. Other melodramas were *Saints and Sinners* (1884), *The Middleman* (1889) and *Judah* (1890). His later plays were comedies of manners, and include *The Masqueraders* (1894), *The Liars* (1897), *Mrs. Dane's Defence* (1900), *The Hypocrites* (1906), and *The Ogre* (1911).

Jones, Inigo (1573-1652), English architect, was sent by Thomas Howard, Earl of Arundel, to study art in Italy. He became greatly interested in Renaissance architecture, and later went to Denmark to work for King Christian IV. He returned to England in 1605 and became architect to the Queen, later receiving the appointment of Surveyor-General of royal buildings from James I. He retained this position until the Civil War, after which he was persecuted as a royalist. Examples of Jones's architectural

work are the banqueting hall at Whitehall, King Charles's block at Greenwich Hospital, and Lindley House, Lincoln's Inn Fields. To Inigo Jones is due the introduction of Renaissance architecture into England (*see ARCHITECTURE: CONSPICUOUS OF HISTORY*).

Jones, (John) Paul (1747-1792), American naval officer, born in Kirkcudbright, Scotland. He joined the navy of the colonists on the outbreak of the American War of Independence (1775) and caused much damage to British shipping. When France joined in the war, Jones was placed in command of a French squadron (1778). In 1781 he was invited by Catherine the Great to join the Russian Navy, was made admiral, and fought against the Turks in the Black Sea. He died in Paris.

Jones, Richard (1790-1855), political economist; he attacked Ricardo's theories, in an essay on *Rent*. He held the Chair of Political Economy at King's College, London, from 1833 to 1835.

Jones, Robert Tyro, junior ("Bobby" Jones; b. 1902), American golfer, by profession a lawyer; winner of the English Open Championship, 1926.



Bobby Jones.

different works. It is a continuation of the Pentateuch. The book deals with the conquest and division of Canaan under the leadership of Moses's successor, Joshua, and may be divided as follows: (1) Chaps. i.-xii. the advance of Israel and the conquest of Canaan; (2) Chaps. xiii.-xxi. the allotment of the land among the tribes, and (3) Chaps. xxii.-xxiv. the final measures taken by Joshua, his farewell address, and his death and burial.

Joss, name given to a Chinese idol. The word is often employed adjectivally, e.g. joss-stick—a stick of incense, joss-house—a temple.

Jotapata, now **Jefat**, 15 m. S.E. of Acre, in Palestine; here the Jews, besieged in A.D. 67 by 60,000 Romans under Vespasian and Titus, were driven by famine to the point of surrender. The garrison, reduced to 40, were persuaded by their leader Josephus (q.v.) to retire to a cavern and die by one another's hands. Josephus, with one other, survived, and surrendered to Vespasian.

Jotunheim (or *Jotun Fjælde*), region in S. Norway with an area of c. 960 sq. m., lying between Jostedalstrø on the W. and Gudbrandsdal on the E. Here stands the mountain Galdhøpiggen, which is 8395 ft. in height.

Joubert, Barthélemy Catherine (1769-1799), French general, joined the revolutionary army (1791), and was made general of division (1796). He fought at Rivoli, in the invasion of Austria, in Holland, on the Rhine, and in Italy. He returned to France, but was immediately given full command in Italy, where he was killed at the battle of Novi (1799).

Joubert, Petrus Jacobus (1834-1900), Commandant-General of the S. African republic (1890-1900), born in the district of Oudtshoorn, Cape Colony, of Huguenot family. He settled in Transvaal, farmed successfully, was elected to the Volksraad (1862), made Attorney-General of the Republic (1870) and Acting President

(1875). He bitterly opposed the British annexation of Transvaal, and was defeated by Kruger in the presidential elections of 1883, 1893, and 1898. He took command of the Boer army in the war of 1899, relinquishing it later through ill-health.

Jouhaux, Léon (b. 1878), French Labour leader. Previously a syndicalist (see SYNDICALISM), he decided during the World War to support the Government, and also to co-operate with the French Socialist Party. He was at the time Secretary of the Confédération Générale du Travail, equivalent to the English T.U.C. (q.v.), and influenced it in a nationalist direction. He was for some time French Labour representative at the International Labour Office (q.v.).

Joule, James Prescott (1818-1889), physicist, born at Salford, Manchester. He made several discoveries in electromagnetism, and did important work on the conservation of energy and the correlation of forces. The electrical unit of "work," the Joule, is named after him.

Jourdan, Jean Baptiste, Count (1762-1833), marshal of France, served as a volunteer in the American War of Independence. He returned to France, volunteered for the revolutionary army, and was made Commander-in-Chief of the Army of the N. in 1793. He fought on the Sambre and the Rhine, leading the left wing into Bavaria, with Moreau and Bonaparte in the centre and on the right. He was defeated at Würzburg, driven back to the Rhine, and held responsible for the failure. In 1798 he introduced conscription, and in 1804 was made marshal of France. He fought in Spain and at Waterloo.

Journalism, a wide term which denotes the work of all whose whole time employment or source of income is the provision or editing of matter for publication in any newspaper or periodical. The means of rapid communication, as well as the wonderfully improved printing mechanism, that have become available

His *Childhood of Bacchus* and his *Christ chasing the Sellers from the Temple* are two characteristic examples of his large and numerous canvases, which hang in almost every public gallery in Europe.

Jordan, sacred river of Palestine, rising on the slopes of Mount Hermon flowing N.-S. The river enters the Sea of Galilee at its N. end; from its S. end it flows to the Dead Sea. The Jordan is roughly 200 m. long. For more than two-thirds of its length it lies below sea-level. Its tributaries are Yarmuk and Jabbok. As part of the Jewish programme of reconstruction, an electric station has been erected at the point where it passes out of the Lake of Galilee, and an electrical system created for the provision of electricity to the whole of Palestine.

Joseph, the husband of Mary, the mother of Jesus, a carpenter by trade (Matt. xiii. 55). What is known of Joseph is to be found in Luke ii. 4-6, 33, 41, 42, 48; Matt. xiii. 55; and John i. 45; vi. 42. The view is held by some that Joseph was a widower with children, and that he lived to be 111 years old. He is the subject of wide devotion in the Roman Catholic Church. Feast, March 19.

Joseph, the eleventh and favourite son of the Israelite patriarch Jacob. His jealous brothers sold him to some travelling merchants, by whom he was taken into Egypt, where he became chief steward to Potiphar, a high official of Pharaoh's Court. By his skill in dream interpretation, he obtained a position of great authority there, and his prudent foresight enabled him to mitigate the effects of a serious famine. His story is told in the later part of the Biblical book of Genesis.

Joseph I (1678-1711), King of Hungary from 1687, succeeded his father as Holy Roman Emperor in 1705. He took part in the War of the Spanish Succession. He tried to settle the succession of the house of Habsburg in Austria by a Pragmatic sanction (q.v.).

Joseph II (1741-1790), Holy Roman Emperor, son of Maria Theresa, became emperor on the death of his father Francis I (1765), and ruled jointly with his mother over the hereditary Habsburg domains. After the death of his mother in 1780 he introduced many reforms, including religious toleration emancipation of the serfs, increase in education, and greater centralisation of government. The latter reform provoked rebellion in Flanders. He planned with Frederick of Prussia and Catherine of Russia the partition of Poland, and with the former signed the Declaration of Pillnitz (q.v.).

Joseph, Auguste Victor Clément Marie (b. 1872), Archduke of the former Austrian empire, 2nd cousin of the Emperor Francis Joseph. In 1914 he commanded the VI Imperial Army Corps, fighting first against Serbia, later in the Carpathians and Poland against Russia, and finally leading the Fifth Army on the Italian front. At the revolution he negotiated between King Charles and Karolyi in Hungary, and for a short while after the communist régime was made Regent (1919), from which position he was deposed by the intervention of the Allied Powers.

Josephine (1763-1814), first wife of Napoleon Bonaparte from 1796, and crowned Empress in 1804. She had previously been wife of the Vicomte de Beauharnais (d. 1794). She was divorced by Napoleon in 1809 for "reasons of State"—she had failed to bear him a son.

Josephus, Flavius (c. A.D. 37-100), Jewish historian and soldier. He became involved in the rebellion of the Jews in 67. He was taken prisoner, but his life was spared by Vespasian (see *ΙΟΥΔΑΙΑ*). He acted as intermediary in 70 between Titus and the Jews besieged in Jerusalem. His historical works include a *History of the Jewish War* (69-70), *Jewish Antiquities*, and an autobiography.

Joshua, Book of, historical book of the Old Testament once held to be written by Joshua, but now regarded as a compilation of a number of

and readable matter. They prune or fill in copy, correct errors, and add headlines and the necessary typographical instructions to the master-printer. As in the case of the reporters there is a great deal of specialisation among sub-editors, each dealing with a subject with which he is particularly familiar: court news; foreign politics; finance, etc.

Training in journalism is still far from being systematised. In England, the first real step in this direction was taken by the London University which constituted regular courses in journalism. The standard of education required from entrants is comparatively high.

Journalists in Great Britain are professionally organised in two bodies: the Institute of Journalists, and the National Union of Journalists. These organisations are watchful in maintaining the status of the profession. Minimum salaries have been fixed for most grades of journalists and hours of work for the regular staffs have been defined. See also NEWS AGENCIES, NEWSPAPERS.

Journet, Marcel (1863-1932), French bass singer, born at Nice. He made his début at the Théâtre de la Monnaie at Brussels in 1891, and at Covent Garden in 1897. He became one of the finest and most popular artists of the London, New York, and Paris opera-houses. Journet appeared at Covent Garden in 1928 in Charpentier's *Louise*.

Jouvenel, Henri de (b. 1878), French politician, served in the Ministry of Justice in 1902 and of Commerce in 1905. He was a member of the Foreign Affairs Commission of 1921 and a delegate to the League of Nations in 1922 and 1924. He became High Commissioner in Syria in 1925 and prepared the Franco-Turkish Treaty of 1926. He was afterwards Ambassador to Rome.

Jove, see JUPITER.

Jovian (Flavius Jovianus; c. 331-364), made Roman Emperor by the Army, 363, in succession to Julian the

Apostate (q.v.). He was driven out of the Roman provinces in Asia. Jovian established Christianity as a State religion and recalled the orthodox Athanasius to the patriarchate of Alexandria.

Jowett, Benjamin (1817-1893), English scholar, remembered as the greatest Master of Balliol College. He was educated at St Paul's School and at Balliol College, Oxford, of which he became a fellow in 1838. At Oxford he came under the influence of the Tractarian Movement, and his interest in theology was expressed in his *Epistles of St Paul* (1855), followed by contributions to *Essays and Reviews* (1860). Meanwhile, as tutor of Balliol since 1842 he won a great reputation for his sympathy and erudition, taking a real interest in his pupils. In 1853 he was appointed Professor of Greek, and in 1870 he was made Master of Balliol, where he ruled with kindly despotism. His outstanding works include translations of the *Dialogues* of Plato and of the *History* of Thucydides.

Joyce, James (b. 1882), Irish author, who has exerted very great influence on the younger school of novelists, critics, and poets, especially by his autobiographical *Portrait of the Artist as a Young Man* (1916), and *Ulysses* (1921).

Joyeuse Entrée (1354), a charter granted by the Duke John III to Brabant, giving the duchy many privileges in return for its assent to a change in succession to the dukedom.

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Juárez, Benito Pablo (1806-1872), Mexican politician, born near Oaxaca,

in the present century, have exerted a revolutionary influence on the form and organisation of modern newspapers.

Collection of news. By the journalist, "news" is defined as something of living and immediate interest, matter which may be useless as news in two or three hours, but which is invaluable at the moment of receipt. For the collection of news as it occurs, the daily paper employs a host of reporters who are sent out to "write up" or describe particular events. There are also numerous resident local correspondents who serve as foci for the gathering of news, and its immediate transmission by telephone or telegram. Of recent years, however, much reporting in London has been done by various Press Agencies, which collect the news and pass it on to the papers, leaving the reporting staff to write up particular events calling for individual treatment.

Among regular reporters there is a great deal of specialisation, as in parliamentary affairs, sport, agriculture, municipal affairs, transport, art, etc. Their work is under the control of a news editor (in London) or a chief reporter who allocates the day's duties, sending each worker to report one or more actual or anticipated events of the day.

There is no special training in the work of reporting; it is a profession in which the worker finds his feet and gathers his experience as he goes on. It is imperative, however, that a reporter should have a knowledge of personalities and the ability to identify them, and be prepared to take full advantage of all circumstances.

For foreign news, newspapers are dependent on a network of foreign correspondents, distributed in key positions. All newspapers of standing also employ two or three special correspondents of renown who are sent to describe events of outstanding interest, such as an international conference, military operations, etc. Newspapers, more particularly those

outside London, also use various news agencies, such as Reuters, for foreign news. Recently, also, there have come into being a number of semi-official news services which supply news which authority is specially desirous of circulating. Thus, there is Renzo (Japanese), Tass (Russian), and Kap (Polish). They are mainly of value as frequently revealing the official attitudes of their countries of origin.

Preparation of news for the press. News reaches a newspaper office in various ways: by telegram, telephone, mail, and personal communication. It is the duty of the editorial staff to sift this mass of matter, rewrite it, provide headings, paragraph it, and give each item its position in the day's "make-up." These several activities are divided amongst the staff in accordance with a definite plan.

The editor-in-chief is in charge of the editing as a whole, though most large papers now also have a managing editor whose duty in some cases is to maintain a balance between the business interests and the editorial requirements of the paper. The editor-in-chief is assisted by a staff of assistant editors, a chief sub-editor, and a number of sub-editors. The paper as a whole is divided up into sections: foreign news, domestic news, literature, finance, sport, women's interests, etc. Each of these sections is usually in charge of an assistant editor, designated as the editor of his particular section; e.g. financial editor, sports editor, etc.

The editor-in-chief communicates to his subordinates the general arrangement of the day's lay-out, particularly as regards political affairs and the leaders, indicating what is to be stressed and the treatment to be accorded. The detail and the arrangement of most other matter is usually left to his assistants. The main work is carried out by the sub-editors under a chief sub-editor. It is they who convert the bare news into attractive

and readable matter. They prune or fill in copy, correct errors, and add headlines and the necessary typographical instructions to the master-printer. As in the case of the reporters there is a great deal of specialisation among sub-editors, each dealing with a subject with which he is particularly familiar; court news; foreign politics; finance, etc.

Training in journalism is still far from being systematised. In England, the first real step in this direction was taken by the London University which constituted regular courses in journalism. The standard of education required from entrants is comparatively high.

Journalists in Great Britain are professionally organised in two bodies: the Institute of Journalists, and the National Union of Journalists. These organisations are watchful in maintaining the status of the profession. Minimum salaries have been fixed for most grades of journalists and hours of work for the regular staffs have been defined. See also NEWS AGENCIES, NEWSPAPERS.

Journet, Marcel (1868-1932), French bass singer, born at Nice. He made his début at the Théâtre de la Monnaie at Brussels in 1891, and at Covent Garden in 1897. He became one of the finest and most popular artists of the London, New York, and Paris opera-houses. Journet appeared at Covent Garden in 1928 in Charpentier's *Louise*.

Jouvenel, Henri de (b. 1876), French politician, served in the Ministry of Justice in 1902 and of Commerce in 1905. He was a member of the Foreign Affairs Commission of 1921 and a delegate to the League of Nations in 1922 and 1924. He became High Commissioner in Syria in 1925 and prepared the Franco-Turkish Treaty of 1926. He was afterwards Ambassador to Rome.

Jove, see JUPITER.

Jovian (Flavius Iovianus; c. 331-364), made Roman Emperor by the Army, 363, in succession to Julian the

Apostate (q.v.). He was driven out of the Roman provinces in Asia. Jovian established Christianity as a State religion, and recalled the orthodox Athanasius to the patriarchate of Alexandria.

Jowett, Benjamin (1817-1893), English scholar, remembered as the greatest Master of Balliol College. He was educated at St Paul's School and at Balliol College, Oxford, of which he became a fellow in 1838. At Oxford he came under the influence of the Tractarian Movement, and his interest in theology was expressed in his *Epistles of St Paul* (1855), followed by contributions to *Essays and Reviews* (1860). Meanwhile, as tutor of Balliol since 1842 he won a great reputation for his sympathy and erudition, taking a real interest in his pupils. In 1855 he was appointed Professor of Greek, and in 1870 he was made Master of Balliol, where he ruled with kindly despotism. His outstanding works include translations of the *Dialogues* of Plato and of the *History* of Thucydides.

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Zapotec Indian parents. He took up law and was appointed advocate of the Supreme Court in 1834. He became liberal Governor of Oaxaca (1847), and Minister of Justice in the subsequent administration. He instituted many reforms, especially curtailing the privileges of the clergy. After a revolution in 1858 he declared himself President and was supported by the U.S. Government. He was driven out by Maximilian in 1864, but returned, and was elected President on the departure of the French Army in 1867.

Jubaland, a former province of British East Africa. The R. Juba and strip from 50-100 m. wide on the British side of the river was ceded by Great Britain in 1925 to Italy, and is now incorporated into Italian Somaliland. The capital and port is Kismayu. Exports include ebony and manila ore. Area, c. 35,000 sq. m.

Jubbulpore (or *Jabalpur*): (1) a district in British India in the Central Provinces, occupying the upper valley of the Nerbudda. The country is well wooded and fertile, and wheat is grown extensively. Iron ore, manganese ore, and limestone are found there. Area, 3900 sq. m.; pop. 1,00,000. (2) Capital of above. The town is modern and well laid out. The chief industries include weaving and spinning, and pottery is made. Pop. (1931) 124,380.

Jubilee: (1) In the Mosaic code, a "year of rest" celebrated every 50 years, when slaves were freed, debts forgiven, and the land left untilled. (2) A Roman Catholic observance, instituted in 1300 by Pope Boniface VIII, who granted special indulgences and spiritual privileges to all Catholics who should visit Rome and pray in certain churches there. It was originally intended to be celebrated every 100 years, but the interval was reduced first to 50, then to 33, and finally to 25 years. (3) The 50th anniversary of any event, such as a coronation or royal marriage; the 60th anniversary is called the Diamond Jubilee.

Jubilees, Book of, O.T. apocryphal

work: probably written in the latter half of the last cent. B.C. It is the oldest commentary on Genesis extant. The aim of the work is to urge the Jews to a more zealous devotion to the Law. It is sometimes called *Little Genesis*.

Judaea, the official name given to the Roman province of S. Palestine after the revolt of A.D. 70. The same term was also popularly applied to that part of Palestinian territory mainly inhabited by Jews and roughly coinciding with Judaea and Galilee.

Judah, a district of ancient Palestine, situated between the Dead Sea on the E. and Philistia on the W., and belonging to the tribe of Judah. Hebron was the capital. Judah was in turn conquered by Babylon, Greece, and Rome.

Judaism, the religion of the Jewish people, from which both Christianity and Mohammedanism are descended. It is in a sense even more than a religion in the limited meaning of the word. By Jews it is regarded as the whole body of Jewish belief, custom, teaching, and practice that have evolved out of the revelation on Mount Sinai and developed under the influence of the intellectual and physical vicissitudes to which the Jews, as a people, have been subjected.

Judaism is regarded by the various sections of Jews, orthodox, and reformed, as a revealed religion, made known by God to man. They hold that God manifested His teachings to human beings through the revelation on Mount Sinai, the Old Testament, and the Prophets. Nevertheless, Judaism also accepts the findings of human intellect, holding as it does that the power of thought is of Divine origin. It is this view-point which has made it possible for Judaism to associate philosophic enquiry with a belief in revelation.

Accepting every phase of human conduct and activity as within the scope of religion, Judaism is not merely a system of abstract beliefs and injunctions, but a comprehensive series

of regulations governing the conduct of its followers in every possible human activity. Although the Old Testament is regarded as the prime source for the laws governing the conduct of Jews, there is also a belief in an Oral Law, the traditions, practices, and injunctions which God is, figuratively speaking, held to have imparted to Moses by word of mouth on Mount Sinai. It is these oral traditions, later subjected to study and discussion by the Doctors of the Law, that evolved into the gigantic Talmudic literature which embraces every phase of life, law, administration, sanitation, ethics, dietetics, etc.

The dogmas of Judaism, or the articles of faith, that have been accepted by all Jews down to the present day, were defined from a close study of Jewish law and tradition by the celebrated philosopher Maimonides (1135-1204). In principle Judaism, apart from its legal, social, and ethical laws, demands a belief in the unity of God, the unchangeability of the Law received by Moses, the incorporeality of God, Divine retribution, immortality of the soul, the resurrection of the dead, and the coming of the Messiah. The Messianic era is held to be connected with the redemption of Israel and the establishment of universal peace and goodwill.

In modern times a powerful reform movement has developed in Judaism, mainly in the U.S.A. and Germany, aimed at dispensing with the greater part of the ancient customs and ritual and leaving only the ethical teachings. Latterly, however, there has been a tendency within the reform movement towards a return to older practice. This has led to the creation of what is known as the conservative movement in Judaism.

The national factor has always been associated with Judaism as a religion. It is this that has influenced both the preservation of the Jew as a nation during the lengthy dispersion and the phenomenal rise of Zionism (q.v.) as a political movement for the re-establish-

ment of the Jewish State in Palestine. Judas Iscariot, one of Christ's Apostles, who subsequently betrayed Him to the priests. He was the only Judean among the Apostles, and was regarded as a man of integrity, being trusted with the money of the Twelve, for whom he acted as treasurer. He took a bribe of 30 pieces of silver to betray Christ, but later returned the money and hanged himself from remorse.

Judas Maccabæus (d. 161 B.C.), one of the members of the Jewish family of the Maccabees. In 166 B.C. Judas Maccabæus led the revolt of the Jews against Antiochus IV Epiphanes of Syria, and captured Jerusalem. He remained ruler of the liberated Jews until his death in action at Elasa. His story is told in the Apocryphal First Book of Maccabees.

Judas-tree, a low, spreading tree belonging to the family Leguminosæ, with beautiful tiny purplish pink flowers produced in profusion in spring. The flowers have a pleasant slightly acid taste, and are eaten in salads or fried in fritters. The tree is a native of the Mediterranean countries, and legend says that Judas Iscariot hanged himself from the branch of one of these trees.

Jude, Epistle of, a short book of the New Testament, notable for its use of Apocryphal writings, and for its close resemblance to the second epistle of Peter. It is generally held, however, that Jude is the earlier writing and that 2 Peter has been copied from it. Some of the obscurities found in Peter can occasionally be rendered intelligible by consulting Jude.

Judge, a person appointed to determine any cause or matter in a court of law. In England the judges of the Supreme Court are appointed by royal letters-patent; and, except for the Lord Chancellor, who changes with the Ministry, they hold office for life, though they may be dismissed on an address by both Houses of Parliament. County Court judges are appointed by the Lord Chancellor.

Judge-Advocate-General, an officer appointed to attend, either personally or through a deputy-judge-advocate, all general military courts-martial to superintend the proceedings, summon witnesses, administer the oath, advise the court on questions of law, etc. The officiating judge-advocate transmits a record of the proceedings to the judge-advocate-general to be laid before the Crown. At naval courts-martial, in the absence of a judge-advocate, the president appoints an officiating judge-advocate who has similar duties.

Judges, Book of, the seventh book of the Old Testament and a sequel to the Book of Joshua. The Judges were heroes who arose from time to time to lead the Israelite tribes against their enemies. Their success resulted in their becoming judicial rulers and, in a sense, the forerunners of the Israelite monarchs. The book may be divided into four parts; (1) the conquest of Canaan after the death of Joshua (i.-ii. 5); (2) prelude to the history (ii. 6-iii. 6); (3) the adventures of twelve judges (iii. 7-xvi. 31); (4) an appendix recounting, amongst other points, the adventures of Micah and the Benjaminites (chaps. xvii-xxi).

Judgment, the decision of a court of law. In the former Court of Chancery the term *decree* was used, but now the term judgment is used in all except matrimonial cases. An *interlocutory* judgment is a provisional decision which does not complete the action.

Judgment Debtor, one against whom there is a judgment ordering him to pay a sum of money. *See also* EXECUTION.

Judicature Acts, statutes of 1873 and 1875 which consolidated the existing superior courts of law into a Supreme Court of Judicature. *See also* COURT.

Judicial Committee of the Privy Council, a tribunal of Privy Councillors, consisting of the Lord Chancellor, the Lord President and ex-Lords President, the 6 Lords of Appeal in Ordinary, and such other members of the Privy Council as have held high

judicial office, with certain Dominion judges. It hears appeals from courts in the Dominions Overseas, or the colonial courts, ecclesiastical courts, and appeals in prize cases from all Admiralty Courts. *See also* COURT.

Judicial Separation, *see* MARRIAGE.

Judicial Trustee, a trustee appointed by, and acting under, the control of the Court. He is an officer of the Court. The office was created in 1896.

Judith, Book of, a book of the Apocrypha which recounts the story of Judith, a beautiful Jewish widow, who, when the Israelites were being besieged by the Assyrians in Bethulia, went over to the camp of Holofernes, general of Nebuchadnezzar, and, pretending to yield to his importunities, cut off his head while he lay asleep.

Juggernaut [jug'GNAWT], a name for the Hindu god Krishna, derived from Jagannath (Orissa), a town in India, where a famous ceremony takes place every March. A monster idol is dragged on a car from its winter to its summer palace, and, though the journey is less than a mile and thousands of devotees help in the ceremony, it takes several days. The legend that worshippers in large numbers cast themselves beneath the wheels of the car and are crushed to death is untrue, though individual incidents have occurred from time to time.

Juggling (Latin, *jocus*, jest), an entertainment, often combined with conjuring, consisting of the dexterous manipulation of knives, plates, balls, etc., which are tossed from hand to hand, large numbers being kept in the air at once, or skilfully balanced on the nose, forehead, lips, neck, toes, etc.

Jugoslavia, *see* YUGOSLAVIA.

Juju, W. African word signifying the objects worshipped by negroes. The word also refers to spirits and gods who are believed to dwell in them.

Ju-jitsu, *see* JIU-JITSU.

Julian the Apostate (*Flavius Claudius Julianus*) (331-363), Roman emperor. Born in Constantinople, he was a nephew of Constantine the Great and was educated as a Christian; he served

for some time in Gaul, defeated the Alamanni at Strasbourg in 357, and was proclaimed Emperor in Paris by the Army, 361. Julian returned, on coming of age, to the pagan religion of his fathers, and though he tolerated the practice of all religions, he prohibited the teaching of rhetoric by Christians. In 362 Julian invaded Persia, but through the treachery of a Persian nobleman, found his forces surrounded by the enemy. Julian was mortally wounded, exclaiming, we are told, "Thou hast conquered, O Galilean!"

Julian Alps, a range of mountains extending from the N.E. borders of Italy through Carniola and Yugoslavia to the Karst plateau. The highest peak is Triglav (9393 ft.).

Julian Calendar, see CALENDAR.

Julius, name of three Popes:




Julius I, Pope 337-352

Julius II (b. 1443), elected Pope in 1503, died in 1513. He banished Cesare Borgia, and in 1508 concluded the League of Cambrai with the Emperor Maximilian I and Louis XII against Venice. In 1511 he concluded the Holy League with Ferdinand of Aragon and with Venice, against France. He laid the foundation-stone of St. Peter's in 1506, and greatly encouraged the arts and literature.

Julius III (1487-1555) was elected Pope in 1550.

Jumna (or *Jamuna*), a river in N. India, rising near Jaminotri in the W. Himalayas, c. 10,850 ft. above sea-level. It passes through Delhi, Muttra, and Agra, and flows into the Ganges below Allahabad, c. 860 m. from its source. The point where the two rivers unite is a pilgrimage centre.

Jumping Hare, a S. African Rodent of uncertain affinity, but more nearly akin to a porcupine than to a hare. It is shaped very much like a kangaroo, and hops in the same way. It lives in burrows and comes out at night to feed.

Jumping Mice, a family of mouse-like Rodents, found plentifully in N. America.  species closely resembles  field mouse, but has  and legs with

which it can leap a distance of 10 ft.

Jumping Shrews, a family of highly organised insectivora, more nearly allied to the oriental squirrel shrews than to the common shrew. They are about the size of rats and have very long snouts. Hopping about on their long hind legs, they look very like jerboas (q.v.). In habits they are nocturnal and insectivorous.

Juncaceæ, the rush family of monocotyledonous plants, related to the lily family, but bearing a superficial resemblance to the sedges and grasses. The family is spread all over the globe, but is not a large one. The rushes are for the most part social plants, and are often of considerable use in fixing the soil of marshes and bogs. The stems of the common species are used for making mats and the wicks of candles.

Juneau, capital of Alaska, U.S.A., situated on the Gastineau Channel. There are gold-mines in the district, but only one is being worked. Some fishing and farming is carried on, and the manufacture of paper is now being developed. Chief exports are gold and furs. Pop. (1930) 4043.

Jung Bahadur, Sir, Maharajah (1816-1877), Anglophile Prime Minister of Nepal, after many vicissitudes in a local feud, became a member of the Fatch Jung ministry (1845). Fatch Jung and 32 chiefs were assassinated (1846) and Jung Bahadur was appointed sole minister by the rani. He visited England (1850). During the Indian Mutiny (1857-8) he supplied the English with a force of 8000 Gurkhas.

Jung Carl Gustav (b. 1875), Swiss psychologist, founder of the Zürich School (q.v.). He was a pupil of Freud (q.v.) until 1911, when he formulated a system of analytical psychology. See also PSYCHO-ANALYSIS.

Jung, Johann Heinrich (1740-1817), German author, wrote under the name of Heinrich Stilling. He met Goethe and Herder at Strasbourg. His autobiographical writing, *Heinrich Stilling's Jugend* (1777), was his best work.

Jungfrau (Ger. "Maiden"), a mountain in the Bernese Oberland, Switzerland, 13,660 ft. in height; one of the three highest peaks in the district. It was first ascended in 1811 on the Valais side, and in 1865 it was climbed from the Interlaken side. A railway, completed in 1912, reaches the Jungfrauoch, a height of 11,375 ft. See also ALPS, THE; EXPLORATION.

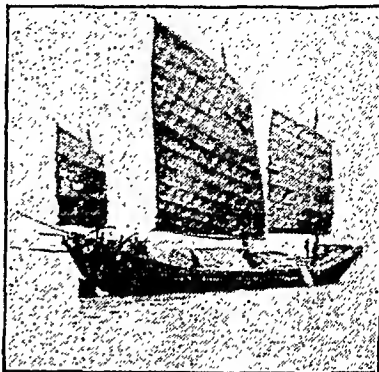
Jungle Fowl, a wild species of fowl, inhabiting the jungles of the East and the species from which our domesticated poultry are descended. It closely resembles a bantam in size and appearance.

Juniper: (1) a large genus of ever-green coniferous trees widely dispersed between the tropics and the Arctic Zone, with stiff pointed leaves and purple berries. Although some of the junipers abroad reach a large size, being then erroneously called Cedar or Cypress, that in the British Isles (*Juniperus communis*) is seldom more than a bush, growing on rather dry barren hills, more common in the N. than in the S. The berries of the common juniper are used for flavouring gin; several varieties are cultivated in gardens. The juniper, the Scots pine, and the yew are the only coniferous native trees of Great Britain. See also CONIFERS. (2) See SPICES AND CONDIMENTS.

Junius, Letters of, anonymous contributions to the *Public Advertiser* (1769-1772), attacking with bitter satire the members of Grafton's ministry. One of them was a scurrilous attack on George III. Their chief interest lies in the mystery of their authorship; at the time of publication the identity of Junius was the most absorbing topic of the day. Sir Philip Francis, Burke, Chatliam, Wilkes, and Horace Walpole have been severally suggested as their author, but the mystery is as deep to-day as ever. The balance of probability rather favours Francis.

Junk: (1) A flat-bottomed native sailing vessel, with high stern and lug-sail of matting, used in Far

Eastern seas, especially by the Chinese. (2) Also rubbish, from a nautical word meaning small bits of waste rope.



A Chinese Junk.

Junkers, the landed aristocracy in Prussia, who have been traditionally the upholders of Prussian monarchy. At first suspicious of Bismarck, they later became his chief supporters in his plans for the unification of Germany.

Junket consists of clotted milk. Formerly it was clotted by laying a piece of the washed lining of a calf's stomach in the milk. Nowadays rennet, the clotting agent, is sold in liquid or tablet form, but tends to lose its strength if kept for any length of time.

Junio, the Roman name for the Greek Hera, chief of the goddesses, sister and consort of Jupiter, and a daughter of Saturn. Her children included Mars, Hebe, and Vulcan. She was the protector of women, especially in childbirth.

Junta, an assembly with powers of legislation and political action (Spanish), especially applied derogatorily in English history. The name is also used for a small group who reorganised trade unionism in England between 1850 and 1880, and worked for labour legislation.

Junto, in English history a group of very influential Whig politicians in the reigns of William III and Anne.

Its leaders were Somers, Russell, Wharton, and Montague. The word is a corruption of *junta* (*qv*).

Jupiter, Roman mythological figure, king of the gods and ruler of heaven, also called Jove. He was the equivalent of the Greek Zeus. Jupiter was the son of Saturn and Ops, the only one of their children not devoured by his father, being saved by his mother, who gave Saturn a stone, instead of her son, to swallow. Jupiter took to himself the heavens, allotting the sea to Neptune and the underworld to Pluto (*qv*). Jupiter's best-known exploits are those in which, by changing his shape, he introduced himself into the company of numerous goddesses, nymphs, and women, by them becoming the father of many of the figures of the Roman pantheon. To Danaë he appeared as a shower of gold, to Leda as a swan, to Europa as a bull, to Juno as a cuckoo, etc. From his many unions, with Themis, Ceres, Mnemosyne, Juno, and other goddesses, sprang the Seasons, the Fates, the Graces, the Muses, Venus, Proserpine, Niobe, Electra, and Semele. He was worshipped with the greatest solemnity.

Jupiter (planet), *see* SOLAR SYSTEM.

Jura: (1) A department of France, originally forming part of the province of Franche-Comté, bordered E. by Switzerland and Doubs and W. by Saône-et-Loire. It is crossed by the Jura Mountains. Maize, oats, wheat, tobacco, and potatoes are grown, and vines are extensively cultivated. Rock salt and iron are mined. Amongst the industries are cheese-making, saw-milling, wine-making, the manufacture of clocks, watches, and toys. The chief rivers are the Loue, Doubs, and Ain. The principal towns are Lons-le-Saunier, Dôle, and St Claude. Forest land occupies c. 400 sq m. Area, 1931 sq m.; pop. 230,700.

(2) A mountain range, stretching along the borders of France and Switzerland, between the Rhine and the Rhône, for c. 160 m. The system a series of parallel ridges, the

chief heights being the Crêt de la Neige (5658 ft.), Colombier de Gex (5545 ft.), La Dôle (5500 ft.), Mont Tendre (5520 ft.), the Reculet (5640 ft.). The geological composition of the range consists mainly of limestone, known as Jurassic.

Jurassic System, a name derived from the Jura Mountains of Switzerland and applied to the beds laid down during the period between the Trias and the Cretaceous.

By the end of the Trias, the Hercynian Continent, which covered most of N. and W. Europe, had been levelled, thus permitting invasion by the Jurassic sea over wide areas. The old continent of "Atlantis," however, still covered the site of the N. Atlantic Ocean, and extended promontories over Cornwall, Wales, Scotland, and Ireland. A comparatively low-lying extension of this continent stretched as far as the site of the Alps, and was affected by slight earth movements; at times it was low-lying land, at times it was overspread by shallow seas. A deeper sea, in communication with the transient waters to the N., was situated over the Mediterranean and N. Africa. In these seas were deposited the Jurassic beds, which fall into three types, each representative of different regions: (1) The Mediterranean type occurs in the Alps, Carpathians, Spain, Italy, the Balkans, the Caucasus, farther India, Central Africa, and Mexico, and consists of marbles, limestones, and calcareous shales, with coral reefs in the upper part. (2) The Middle European type occurs in France, Germany, England, parts of Spain, and in Australia, New Zealand, S. Africa, the Argentine, and elsewhere. It is marked by the development of extensive coral reefs. (3) The Russian or Boreal type is developed in N. Europe and N. Asia. Only the higher beds of the Jurassic are developed, and there are no corals.

The occurrence of climatic zones has been suggested to account for these differences in fauna and lithology,

especially with regard to the repetition of Middle European types in the S. Hemisphere and the absence of corals from the N. areas.

The British Isles at the beginning of the Jurassic were beneath a shallow sea. Around this shallow sea were low-lying lands, in Ireland, Wales, Cornwall, Scotland, Belgium, and N. France. The main Jurassic outcrop now runs from Dorset to Yorks, but probably it originally covered most of England and extended into Scotland and Ireland. The maximum development in general is in the S. and Midlands, where there was a general tendency towards depression of the land, whereas to the E. in areas of uplift, the deposits tend to be thin or absent.

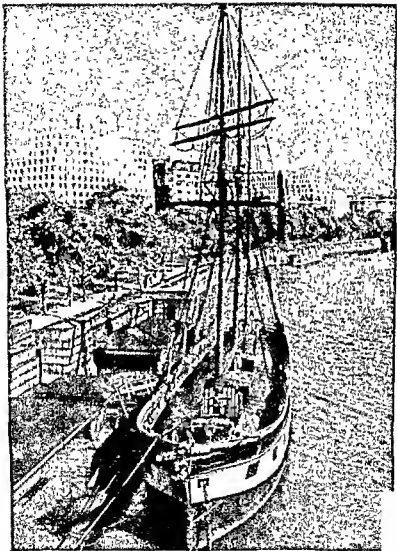
The British Jurassic strata are all fairly shallow water deposits, and most are marine. They include three of the four great British deposits of clay, the Lias, Oxford, and Kimmeridge clays (q.v.), which were laid down in muddy seas of moderate depth. Be-

tween these deposits, limestones were laid down in clearer water, and towards the end of the Jurassic, as a result of general uplift, deposits were formed only in the S. part of England, and these were laid down in very shallow water or estuarine conditions.

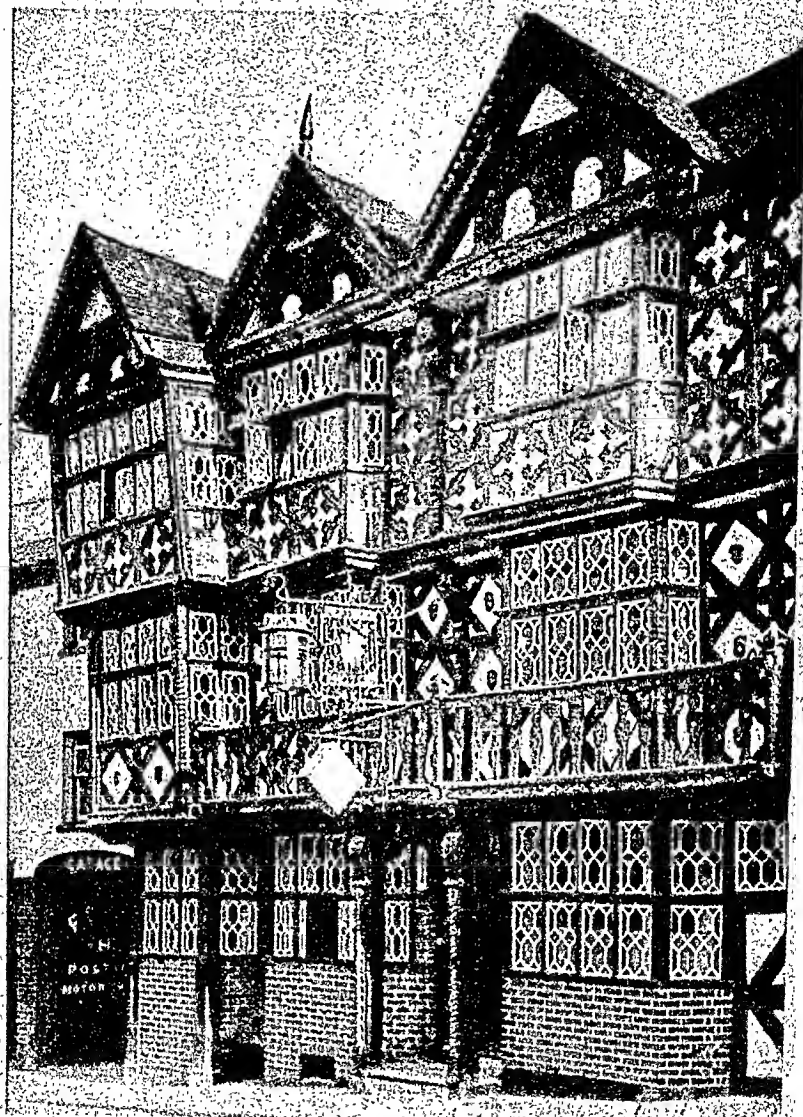
Of the animals which flourished during the Jurassic, the most interesting were the great Reptiles. The Ichthyosaurs and Plesiosaurs (q.v.) were adapted for life in the sea, the Pterodactyls (q.v.) were flying reptiles, while the huge Dinosaurs (q.v.), some of which attained a length of 80 feet or more, were terrestrial. The earliest bird, *Archæopteryx* (q.v.), occurs in the Jurassic of Bavaria, while small marsupial mammals are found but rarely. Bony fish occur, but are not important. Among the Invertebrates, the ammonites were supreme, but the Gastropoda and Lamellibranchia (q.v.) were well represented, as were Brachiopoda and Sea Urchins (q.v.) in the limestones. Belemnites also should be mentioned. Among plants, con-

TABLE OF BRITISH JURASSIC DEPOSITS

	Period.	S.W. England.	Yorks and Lincs.	W. Scotland.	N.E. Scotland.
UPPER	Purbeckian	Freshwater deposits. Passage beds into Cretaceous.	Marine clays.	Nature not yet proved.	Not proved.
	Portlandian	Sandstones and Limestones.	Absent.	Not proved.	Not proved.
	Kimmeridgian	Dark shale and cement stones, often carbonaceous.		Not proved.	Marine shales, limestones, and sandstones with an estuarine intercalation.
	Corallian	Limestones and clay.	Limestones.	Not proved.	Estuarine white sandstone and marine limestone and shales.
	Oxfordian.	Dark clays.	Dark clays.	Dark clays.	Marine sandstones and sandy clays.
MIDDLE	Cornbrash. Bathonian (Great Oolite)	Rubby Limestone. Oolitic limestones and marly clays.	Rubby limestone. Estuarine sandstones, limestone and shales, marine in part.	Not present. Thick estuarine and freshwater deposits in places.	Not present. Estuarine deposits.
	Bajocian (Inferior Oolite).	Oolitic limestones, ironstones and sandstones.	Estuarine sandstones and shale with marine limestone intercalations.	Marine sandstones and marls.	Estuarine deposits.
LOWER	Lias.	Blue-grey clays with thin beds of cement stone and bands of ironstone.		Marine sandstones and shales.	Estuarine and marine deposits.



LONDON . SHELL-MEX HOUSE AND THE VICTORIA EMBANKMENT



"THE FEATHERS," LUDLOW, SALOP

fers, ferns, and, especially, cycads (*q.v.*) are important.

Thin seams of coal occur in the Middle Jurassic of Yorkshire and the Oxford Clay deposits in Scotland, but economically important coal-beds are found in the Lias of Hungary and many parts of Asia, and New Zealand.

Oil shales are important in the Jurassic of Germany, and in the Kimmeridge Oil Shale in Dorset. The Lower Lias furnishes hydraulic cement, and sometimes is burnt for lime, while both it and the Oxford Clay, especially the latter, are used in the manufacture of bricks.

The most important economic products of the British Jurassic, however, are the iron ores and the building stones. The iron ores furnish the bulk of the British iron, and mostly occur in the Lias, which includes the Frodingham iron ore of Lincolnshire, the Cleveland ore of Yorkshire, and those of Leicestershire and Oxfordshire, as well as the ore of the island of Raasay. The Northamptonshire iron ore is Middle Jurassic, and the Abbotsbury iron ore Cretaceous in age. Important iron-ore deposits occur in Lorraine. Building stones are very important in the Middle Jurassic, where the Inferior Oolite furnishes the Lower Freestone of Gloucestershire, and important building stone in Somerset, as well as the Collyweston roofing slate, and the Lincolnshire limestone, used in Peterborough and Ely Cathedrals and in old St. Paul's. The Great Oolite yields the Bath freestone. In the Upper Jurassic the Corallian supplies the stone used in many of the Oxford colleges, and the Portland Stone is the material of which St. Paul's Cathedral and the British Museum are built. Purbeck marble is used for interior work, as in the Temple Church.

Jurisdiction, the extent of legal authority; it may be limited either locally, as that of a county court, or as to the amount involved or the gravity of the offence, etc.

Jurisprudence, the science of law; in its generic sense includes the entire

body of learning in regard to law, but in a more specific sense it may be deemed theoretical jurisprudence, or philosophy of law, as dealing with basic principles. It is divisible into 3 branches, analytical, historical, and ethical. Until the end of the 18th cent. the last method of treatment was preferred; since then, mainly under the influence of John Austin, English writers have treated it analytically and historically.

Jury, in English law, a number of persons sworn to deliver a verdict upon evidence laid before them. Trial by jury can be traced back to Anglo-Saxon times, though it was not firmly established until, in 1186, a statute of Henry II ordained that 12 lawful men from each hundred should be sworn to accuse criminals, and that persons so presented should be sent to the ordeal (*q.v.*) This, the **GRAND JURY**, continued to be summoned for every Assize until its abolition in 1933, and enquired only into the accusation.

At the present day the indictment (*q.v.*), which it was its function to present, may be preferred by any person by the direction or with the consent of a judge of the High Court, or if the person charged has been committed for trial. The abolition of the grand jury is probably justified, since ample safeguards have been provided against unjust accusations, while the waste of time and money involved by the old procedure is avoided.

When ordeal fell into disuse, the grand jury took over the duty of actually trying the accused, but the practice grew of impanelling a fresh and unprejudiced jury, and received statutory force in 1352. This is now the **PETTY JURY**. In civil cases, trial was originally by ordeal, battle, or compurgation (*q.v.*). The compurgators, like the jurors of those days, were neighbours who knew something of the transaction. It was not till Edward III that witnesses gave evidence without having any part in the verdict, but such evidence was given out of Court. In the reign of Henry IV,

witnesses who were not jurymen gave evidence in Court: the principle that jurors are not witnesses but judges of fact began to be established, though their position was not firmly settled until the 17th cent.

Coroners' juries (*see* CORONER) now consist of any number between 7 and 11, and generally of 9. Petty and civil juries consist of 12, county court juries of 8.

In civil causes the jury may be either a COMMON JURY, or a SPECIAL JURY for the more important and difficult cases in the King's Bench Division. There is no remuneration for criminal juries nor for common juries, but special jurors receive a guinea a cause and county court jurors 2s. During an action or a trial, except for murder, treason or treason-felony, the jury may separate at the end of the day to their own houses, being charged not to converse with any person on the subject of the trial. The qualification of jurors is property worth £10 a year freehold, or £20 a year leasehold, or assessment to the poor rate, or house duty for a house of £30 a year in Middlesex and London, and £20 a year in other counties. A special juror must have the same property qualifications, and be legally entitled to be called esquire (*q.v.*), or be a person of higher degree, a banker or a merchant, or occupy a house of a certain rateable value. Since 1919, women are entitled to serve on the same basis as men. Lunatics and felons are disbarred, and certain persons such as chemists, medical practitioners, dentists, members of H.M. forces, etc., may claim exemption.

Jus Gentium (*Lat.* "law of nations"), in Roman law, the law applicable to all mankind, as distinct from civil law, or *jus civile*, which was reserved for Roman citizens only.

Jus Primæ Noctis [YOOS PRÆMI NOCTIS] (*Lat.* "right of the first night"), in feudal law, the lord's right of concubinage with his tenant's wives on their wedding night. It has been denied that so remarkable a

custom ever existed in England and Scotland, but the evidence adduced in support of this denial seems unsound.

Jus Relictæ (*Lat.* "the right of the survivor"), in Scots law, the right of a widow to a third of her deceased husband's personalty if there be children, and to a half if there be none.

Jusserand, Jean Adrien Antoine Jules (1855-1932), French statesman and author, held many high diplomatic posts, including the ambassadorship in U.S.A. (1902-25). He was an authority on English literature. His works include *The English Theatre from The Conquest to Shakespeare* (1878), *The English Novel* (1886), *The Literary History of the English up to the Renaissance* (1894) and other literary and critical essays.

Jussieu, Antoine Laurent de (1748-1830), made the first great advance in a natural classification of plants. The families had been fairly well recognised before him, but he undertook careful and long-continued researches to discover what characters were the common property of a natural group.

Jussieu, Bernard de (1699-1777), great French botanist of the time of Linnæus; was at first a physician at Lyons, but became professor at the Jardin du Roi in Paris, and published a work on the natural families of plants based on that of Linnæus.

Justice of the Peace, *see* COURT.

Justices, officers appointed by the Crown to administer justice. The judges of the High Court are called justices, but the word is usually applied to petty magistrates, called *justices of the peace*, who administer summary justice in minor matters. *See also* COURT.

Justiciar, Chief, an officer first appointed by William the Conqueror; he was the King's right-hand man, the head of the King's council, and Viceroy when the King was abroad, as happened frequently. The last Chief Justiciar was Hubert de Burgh, who was dismissed in 1232.

Justiciary, High Court of, the su-

preme criminal court of Scotland, from which there is no appeal.

Justifiable Homicide, *see* HOMICIDE.

Justification, a reason excusing certain conduct, *e.g.* at law, in an action for libel, a defence showing the libel to be true.

Justin Martyr (c. 100-165), Christian Father whose wide reading and deep study of different schools of philosophy resulted in his becoming, in turn, a Stoic, a Pythagorean, and, finally, a Christian. His writings include *Apology* to the Emperor Antoninus, which is a defence of Christianity from Pagan attacks; and *Dialogue with Trypho the Jew*, which deals with Judaism. Justin was martyred c. 165.

Justinian I (483-565), Emperor of the E. Roman Empire (527). He warred successfully against the Vandals in Africa and Ostrogoths in Italy, and unsuccessfully against the Persians, wars which had the result of weakening the Empire financially. In Church affairs he tried to reconcile the Monophysites (*q.v.*) with the orthodox party, but this brought about a schism between East and West which lasted nearly a century. It is as a legal reformer that Justinian is best known. He consolidated the existing law into the *Digest*, a collection of opinions of jurists, and the *Code*, a collection of statute laws. *See also* BYZANTINE EMPIRE.

Justinian II (c. 669-711), E. Roman Emperor, 685, was dethroned in 695 and exiled. He captured Constantinople and reascended the throne in 701. He was assassinated.

Jute, fibre from two species of *Corchorus*, a genus of the order Tiliaceæ, grown principally in Bengal and Assam. The plants attain a height of c. 10 ft., and the fibre occurs as bast beneath the bark, and is peeled off in strips up to 7 ft. in length, which are made into goods in the Calcutta and Dundee jute mills. It is suitable for canvas manufacture, and the better quality is used for carpets and tap-
from flax and

hemp (*q.v.*) in being coarser.

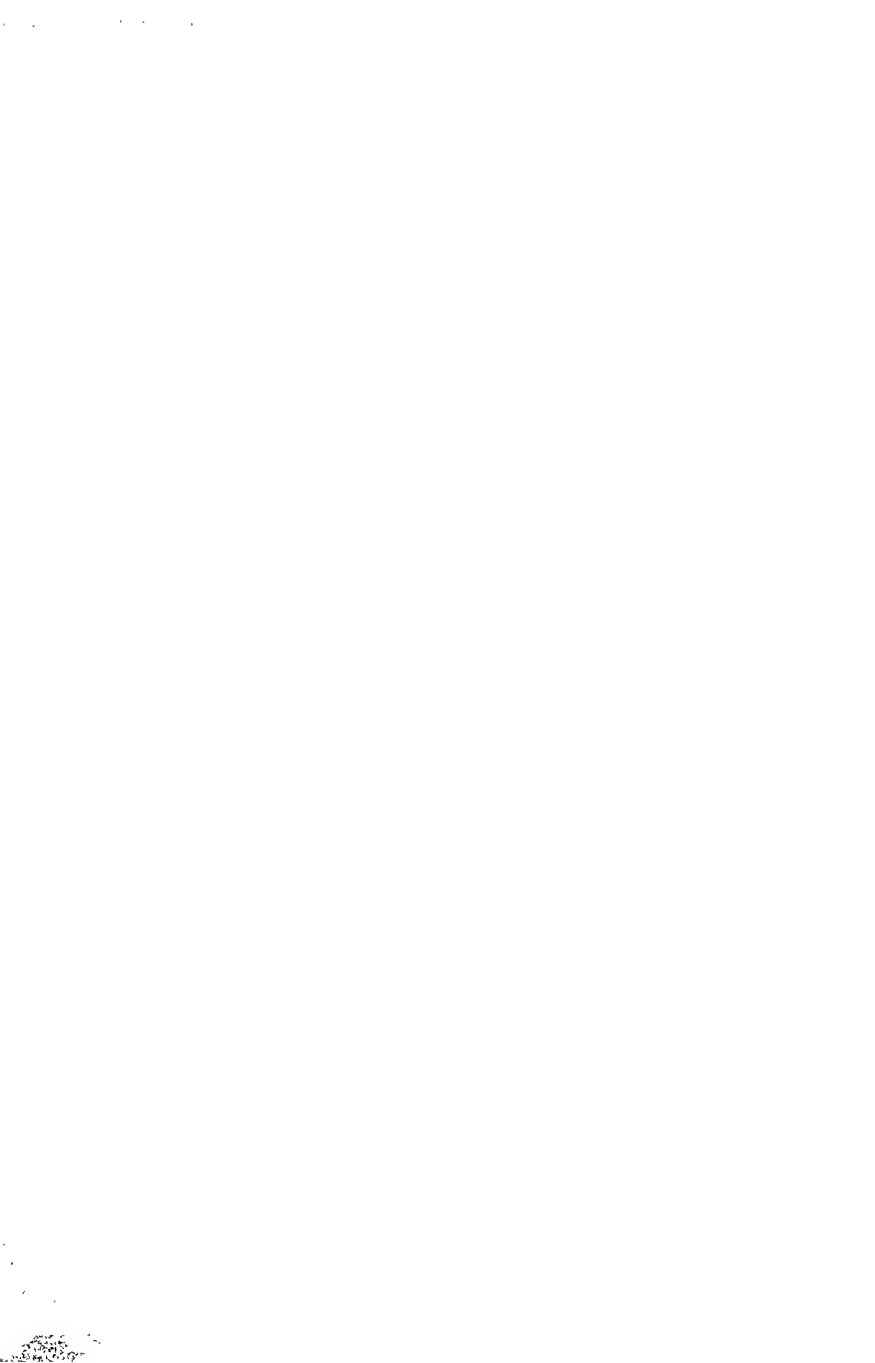
Jutes, a tribe of low-German extraction, previously settled in Jutland, who invaded Britain in the 5th cent. A.D., together with Angles and Saxons. They settled in the S. parts of England, mainly in Kent and Hampshire. Hengist and Horsa (*q.v.*) were probably Jutes.

Jutland. The Danish portion of the peninsula which extends from Skagen (the Skaw) in the N. to Flensburg Fjord in the S. Jutland is separated from Norway by the Skagerrack and from Sweden by the Cattegat, whilst the Little Belt on the E. divides it from Fyn (Fünen). Jutland consists of 9 counties. Its greatest stream, the Gudenaa, flows N.E. into Randers Fjord. The W. coast consists of sand-dunes and marsh-land. The centre has, through the industry of the people, been converted from barren moors into pine woods and fertile fields. On the E., the country is dotted with hills, woods, lakes, and fjords. The W. coast has only one port, Esbjerg, on the E. the principal are Koeding, Fredericia, Vejle, Horsens, Aarhus, Randers, Aalborg, and Frederikshavn. Agriculture and fishing are carried on extensively. Area, 11,412 sq. m., pop. (1930) 1,623,360. *See also* DENMARK.

Jutland, Battle of (May 31, 1916), naval action between the British Grand Fleet and the German High Seas Fleet during the World War (*q.v.*). Although British losses were heavier than the German, and the German Admiral, Scheer, escaped, after being cut off, the action left the Grand Fleet in possession of the seas, and the German High Seas Fleet never again attempted action. The British objective was the defeat of the German Navy, as Allied victory depended on naval supremacy. The Germans desired to defeat detached portions, and so to weaken the Grand Fleet as to be able to overwhelm it, and also to break the blockade.

A scouting force of light cruisers under V. set out to





K2

K2 (Mount Godwin-Austen), the second highest peak in the world, a mountain of the Karakorum or Mustagh range of the Himalayan system, situated in the extreme N. of Kashmir, near the border of Turkestan. The height is estimated at 28,250 ft.

Kabbalah, Hebrew word meaning "tradition", the body of Jewish mystic doctrine concerning God, creation, and the universe, said to have been handed down from remote ages and possessed in every age by an instructed man.

It would appear that these esoteric traditions, limited to initiates, were of great antiquity, for reference to them may be found in the earlier Talmudic writings as well as in the works of Josephus and Philo Judæus. They included such matters as the mysteries of creation, contemplation of God's being and the origin of the Universe, the calculation of the date of the Messianic era, and the miraculous use of the Divine Name.

The Kabbalah is an attempt, by means of allegorical interpretations, to read into the scriptures a system of thought and speculation which would harmonise Holy Writ with philosophy and human experience. It evolved a philosophy which attempted to mark the stages both between God and the world, and the road along which the soul travels to God. It taught that there was a series of ten divine emanations or *Sefirot*. These were distinguished from one another as the different colours of the same light. They were infinite only in so far as the Infinite (God Himself) endowed them with infinity. Humanity belonged to the lowest of these *Sefirot* and was the power of reaction, the very source of the evil which thus hindered or

K

Kadi

enlarging the gracious gifts from the Deity.

A great influence on the study and development of the Kabbalah was the appearance of the *Zohar*, the Book of Splendour, in the 13th cent. It was essentially a compilation of Jewish mystic lore that had previously been transmitted orally or existed in manuscript form current among initiates. In form it was a running philosophic and allegorical commentary on the Pentateuch; its language was Aramaic. The compiler claimed that the author was Simon, son of Yechai (c. A.D. 160), said in Talmud legend to have concealed himself for 13 years in a cave contemplating the Divine mysteries.

The Kabbalah has given rise to a vast Jewish literature and to schools of mysticism which have had considerable influence on the Jewish liturgy and on the course of Jewish history (see **SHABBATAI ZEVI**).

Kabul, capital of Afghanistan, on the Kabul R. It is situated at the junction of several important caravan routes to Turkestan, India, and Bokhara. In the city are a number of factories for matches, buttons, and small arms and ammunition. There is a High Court sitting at Kabul, which was made the capital by Timur in 1774. In 1839 it was captured by the British, but 2 years later an insurrection broke out, ending in the massacre of British officers. In 1879 the British political Resident was murdered, and for a year the city was again occupied by the British. Pop. c. 80,000.

Kabul River, rising in a range near the Hindu Kush, Afghanistan, is the one important river of that country, flowing for 285 m. until it reaches the Indus at Attock.

Kadi, see **CADI**.

Kaffir Bread, pith derived from the tree *Encephalartos caffra*, used as food by the Kaffirs, a Bantu people of South Africa.

Kaffir Wars, between the British and Kaffirs in 1811, 1818, 1829, 1835, 1846, 1851-2: the British were always ultimately successful. In 1854 Kaffraria was made a Crown Colony (British Kaffraria), and in 1865 was incorporated with Cape Colony.

Kagoshima, the capital of Satsuma, on the Gulf of Kagoshima, Japan. It manufactures small-arms, cotton goods and pottery. Pop. (1930) 137,236.

Kagu, a bird about the size of a fowl; it is an ancient type linking the cranes and the rails (*Rallus aquaticus*). It is grey in colour, with red legs and bill, but its flight feathers are ornamented with bars and shots of black, red, and white, and it has a long crest hanging over the neck from the back of the head. It is found only in New Caledonia.

Kahn, Gustave (b. 1859), French author, one of the Symbolist school, was one of the first practitioners of *vers libre*. He founded *La Vogue* (1886), and was a follower of Mallarmé. His works include poems, novels, and critical essays.

Kai-Feng, capital of Honan Province, China; a walled, historic city near the Hwang-Ho, the floods of which are often destructive to buildings and trade in the town. The surrounding districts are agricultural, and within Kai-Feng a cotton industry exists. Pop. c. 223,500.

Kailyard School, a term sometimes applied to a class of fiction in vogue towards the close of the 19th cent. which describes the common life of Scotland with much insistence upon the dialect. Among members of this school were Ian Maclaren, Sir J. M. Barrie, S. R. Crockett, and J. J. Bell.

Kaiser, Georg (b. 1878), German dramatist, is the author of many comedies and serious social-problem plays. They include *Von Morgen bis Mitternacht* (1916), which was acted in

translation in England in 1926 as *From Morn to Midnight*, and *Gas*.

Kaiserslautern, town in Bavaria, with large textile factories, breweries, household furniture works, foundries, and boot and shoe manufactories. It took part in the Reformation at its birth. The site of Barbarossa's castle is now occupied by a prison. Pop. 62,500.

Kaiser Wilhelm Canal, see **KIEL CANAL**.

Kaiser Wilhelm's Land, a section of N.E. New Guinea placed under Australian mandate after the peace treaty of 1919. From 1884 until then it had been a German protectorate.

Kakapo, a nocturnal parrot about the size of a raven and green in colour, formerly plentiful in New Zealand but now almost extinct. Although possessing wings, the kakapo cannot fly.

Kalahari Desert, in Bechuanaland, in the W. of S. Africa. Its most S. point is the Orange R. The area contains much pasture-land and a quantity of big game. The Rs. Molopo and Kurumari suffer seriously from drought in their course through the Kalahari, and the life of its nomadic population is precarious. Area, 120,000 sq. m.

Kalamazoo, city in Michigan, U.S.A. The principal industry is paper manufacture. At one period it was an Indian trading depôt. It is now developing as a rail centre, has a municipal airport, a growing engineering industry, and fruit and celery cultivation. Pop. (1930) 54,786.

Kalát, States of: (1) A confederation of tribes in Baluchistan under the Khan of Kalát, subsidised by Britain. The territory stretches W. to Persia. It has a postal and telegraph service. In its N. valleys wheat, tobacco, and fruit are cultivated; in the N.E. horses and cattle are raised. The rest of the area is arid. Area, with Las Bela, 76,300 sq. m.; pop., c. 340,000. (2) Capital of (1).

Kaleidoseope, an apparatus generally used as a toy, but sometimes also by designers, for producing symmetrical patterns by multiplying the

images seen in a set of mirrors. In the simplest form two strips of mirror glass are set at an angle, and the eye looks down their line of intersection at an object, which may have any form.

Kalends [KA'LENDZ] *see* CALENDAR.

Kalentan, *see* MALAY STATES.

Kalevala [KALEVAH'LÖ] (or *Kalewala*), the title of the great Finnish epic which tells of the three sons of Kalewa (Finland), and their various adventures. On its style and metre (trochaic octosyllabics), Longfellow based his *Hiawatha*. An English translation of Kōnnröb's edition (1849) by W. F. Kirby was published in 1907.

Kalgoorlie, gold-mining centre in W. Australia, 50 m. from Coolgardie (q.v.), which it resembles closely. It is supplied by the Goldfields Water Supply system, a 1200-m. pipe-line. Gold production is still great and agriculture is growing. Pop. 5700.

Kali, in Hindu mythology, the wife of Siva, is also known as Durga. She is the goddess of destruction. Calcutta (Kalighat) is named after her.

Kālidāsa (4th or 5th cent. A.D.), Indian poet and dramatist, was the author of 3 dramas, of which *Sakuntala* is the best known; also of several epic and lyric poems.

Kalinin [KALYN'IN], Mikhail Ivanovich (b. 1875), president of the Central Executive Committee of the Soviet Union. He was the son of a peasant in the province of Tver. He entered the Putilov factory in Leningrad at the age of 16, and joined the Social Democratic Party. He was imprisoned for his revolutionary activities, but managed to remain working "under cover" in Leningrad until the revolution in March 1917. In 1919 he became a member of the Central Committee of the Party, and was later made president.

Kalisz, town in the province of Lodz, Poland. Its manufactures, mainly for local consumption, are brewing, tanning, sugar, and cloth. In 1706 the Poles decisively beat the Swedish troops here. Pop. 55,113.

Swedish port on the Baltic,

province of Kalmar.

There is shipbuilding of small craft; a flourishing match industry, and an export trade in oils and timber. It is an old town with a cathedral and many wooden houses. Pop. (1932) 20,177.

Kalmuks (or *Kalmucks*), a Mongolian people inhabiting Central Asia and the Caucasus. Large numbers migrated from Asia to Europe in the 17th cent., and several hundred thousand returned to Mongolia in 1771. Over 150,000 still inhabit the steppes of Astrakhan, and there are some 15,000 in the Caucasus. They also occupy regions in Sinkiang and N.W. Mongolia and a southern area in N. Tibet.

Kalocsa, town on the Danube, Hungary, in a flourishing agricultural region where cereals, fruit, flax, hemp, and rice are extensively cultivated. It is one of the oldest Hungarian towns, and contains an ancient cathedral, archiepiscopal residence, and observatory. Pop. c. 13,000.

Kaluga [KALŪGG'A]: (1) Province of central U.S.S.R., S. of Moscow, comprising an open plain watered by the R. Oka, a tributary of the Volga. Agriculture (flax, rye, oats, and vegetables) is pursued; but the soil as a whole is not very productive. Coal of inferior quality is obtained in some districts, and some iron is mined. Area, c. 9950 sq. m.; pop. c. 1,152,000. (2) Capital of the province, situated on the Oka, c. 100 m. S.W. of Moscow. The chief industries are brewing and brick-making; the manufacture of leather and iron goods, textiles and tallow. Pop. c. 52,600.

Kamskura, coastal village c. 12 m. from Yokohama. It is a spot of great natural beauty, and contains many shrines, including a colossal bronze image of Buddha over 50 ft. high.

Kamchatka: (1) A large peninsula of North-Eastern Siberia between the Sea of Okhotsk and the Bering Sea. The backbone of the peninsula is a chain of volcanic mountains trending S.E. and rising to nearly 16,000 ft., drained by the R. Kamchatka (c. 300 m.). The climate is severe—a short

cool summer with heavy rains or fog. and cold winter temperature, so that most rivers are icebound. The fisheries (especially salmon) are important, and the peninsula abounds in valuable furbearing animals. The nomadic population is largely dependent on herds of reindeer, bred in great numbers. Petropavlovsk, chief fishing port, has an important wireless station. The peninsula is c. 700 m. long with a greatest breadth of 300 m. Area, c. 105,000 sq. m.; pop. c. 20,000. (2) A province in the newly constituted Far Eastern Area, R.S.F.S.R., comprising the Kamchatka peninsula and a large region on the mainland to the N. Pop. c. 31,000.

Kamel, Hussein (1853-1917), first Sultan of Egypt; succeeded in Dec. 1914, when the anti-British Abbas Hilmi was deposed by the British Government. He was loyal to the British, and took a great interest in the welfare of Egypt.

Kamerun, see CAMEROONS.

Kamet, Mount, Himalayan mountain in the N. of the Kumaon district of the United Provinces. It was successfully climbed by F. S. Smythe's expedition in 1931, and is the highest peak (25,447 ft.) yet conquered.

Kanakas, an aboriginal Polynesian people living in the Hawaiian Islands. They are brown in colour, tall, and strongly built. The name was given to them by the early South Sea whalers, who largely made up their crews of these people, and has been extended to the natives of other Pacific Islands, such as New Caledonia, and to the workers on the Queensland sugar-plantations.

Kanauj, town, in Farukhabad, United Provinces, British India. The manufacture of perfume is its outstanding industry. At one time the capital of an imposing Hindu kingdom, it fell before the Moslem invaders during the 12th cent. Pop. c. 19,000.

Kanchenjunga, a mountain in the Himalaya range, height 28,146 ft., whose summit has not yet been reached. The international expedition of 1920-

30, and a later attempt by Germans in 1931, are the most recent failures to reach the summit. (See p. 168.)

Kandahar, city of Afghanistan, controlling the principal entrance to the Bolan Pass. The town stands on a lofty rock, and is strongly fortified. Its exports are wool, fruit, and foodstuffs. A small silk industry exists. Trade is mainly with Bombay, Herat, and Samarkand. Pop. c. 60,000.

Kandahar, Battle of: (Sept. 1880): General Sir Frederick (afterwards Lord) Roberts—after his march from Kabul to Kandahar, when he had brought a force of nearly 10,000 men 313 m. in 23 days with the loss of only 20 camp followers and 4 native soldiers—completely defeated the Afghans under Ayoub Khan.

Kandersteg, winter tourist centre in the Bernese Canton, Switzerland. It is in the middle of the Bernese Oberland, standing 3800 ft. high. Pop. c. 3500.

Kandy, town in the centre of Ceylon, once its capital. It produces tea, cocoa, and pepper. There are a number of temples, in one of which a tooth of Buddha is preserved and venerated. Pop. (1931) 36,541.

Kangaroo Rats (or *Rat Kangaroos*) are small representatives of the kangaroo family, with long digging claws on the fore-feet, short rounded ears, and hairless tails. Kangaroo rats do not exceed the size of a rabbit in size, and lurk mostly in scrub-jungle. They seldom hop like kangaroos.

Kangaroos, large or medium-sized herbivorous marsupials (*q.v.*), found only in Australia and the New Guinea islands, and distinguished from the nearest allies, the Phalangiers (*q.v.*), by having the hind-limbs larger than the fore-limbs and four-toed, and by the hinder part of the body being heavily built in comparison with the chest and shoulders. These modifications are subservient to the habit of kangaroos of hopping on their hind-legs or squatting on them, supported by the tail.

There are a large number of species, differing in size and other characters. The largest is the *Grea*

or *Old Man* kangaroo, which may be c. 6 ft. high when standing erect. It can travel at great speed, covering from 20 to 30 ft. with a single leap, and affords excellent hunting on horseback with hounds. The *Wallaroo* is also a large species, but has coarse hair and lives in the mountains. The smaller species are called *Wallabies*.

In all kangaroos the young, one or two at a time, are born in an immature condition, and are placed by the mother in her pouch until they can venture out.

Kangra, district in Punjab, British India. Tea was introduced for cultivation in 1850, and is now an important industry. Others are rice, honey, and apices. The chief town is Dharnasala. A government-supported fair attracts many visitors. Area, 9078 sq. m.; pop. of province c. 780,000. Kangra town, with its temple, was destroyed in 1905 by earthquake.

Kanishka, a king in N. India, c. A.D. 200, who was converted to Buddhism and held a famous Buddhist council which codified the sacred writings of Buddhism.

Kano, a province of N. Nigeria, under British control since 1903. It lies between French W. Africa to the N. and the Provinces of Bauchi, Zaria, and Niger to the S., and is bounded on the E. and W. by Bornu and Sokoto respectively. It is fertile, and in places highly cultivated and densely populated. The towns are walled. It is now controlled by an emir, resident in Kano, the capital, which is an important trading centre. The area of the province is c. 30,000 sq. m., and the pop. c. 2,750,000.

Kansas, a central State in the U.S.A., is one of the chief wheat-producing areas in America. The raising of Kaffir corn is practically confined to Kansas. Other crops cultivated are maize, oats, barley, rye, flax, and potatoes. Dairy farming and sheep farming are successfully carried on. The coal and petroleum areas are also very productive, other products being cement, zinc, and salt.

Government is vested in a Senate of 40 members, and a House of Representatives, composed of 125 members. It has 105 counties and the capital is Topeka. Kansas sends 2 senators and 7 representatives to Congress. Area, 82,158 sq. m.; pop. of Kansas State (1930) 1,881,000.

Kansas City, city of Kansas State, U.S.A. Next to Chicago the most important live-stock centre in the United States. There are enormous meat-packing establishments, grain elevators, railway shops, soap factories, and flour-mills. Pop. (1931) 121,857.

Kan-su, province in N.W. China. It is drained by the Hwang-ho and in parts is very mountainous, with fertile valleys which cannot, however, produce enough crops to feed the entire population. Maize and millet are the main crops. The poppy is heavily cultivated and Kan-su is famous for its opium output. Cattle breeding is general. Minerals are found in many parts, those for export being gold and silver. The capital is Lanchow. Area, 125,450 sq. m.; pop. (estimated) 7,425,000.

Kant, Immanuel (1724-1804), German philosopher, born in Königsberg of Scottish descent. In early life a keen student of the classics, he originally intended to enter the Church, but on his father's death became a private tutor. In 1770 he secured a Professorship of Logic and Metaphysics at Königsberg, and in 1781 published his first philosophical work, 10 years later Kantian philosophy, despite its obscurities, was being expounded in all the German universities, and young men flocked to Königsberg to hear Kant lecture. But in 1792 he got into trouble with the authorities, the Government considering his doctrine of moral rationalism opposed to Lutheran Christianity. King Frederick William II exacted from him a pledge not to write or lecture on religious subjects, but in 1797, on the King's death, Kant was freed from his pledge. He immediately produced a work stressing all his strongest theological arguments. In 1802 his sight

failed and his mind began to wander.

Kantian philosophy, generally known as "transcendentalism," begins with a critical examination of the human capacity for knowledge. To unite knowledge with reality Kant postulates that "things in themselves," or objective reality, exist *a priori*, and become sensations as the mind apprehends them. "Things-in-themselves" are not "derived from experience, but make experience possible." All that does not fall within the realm of human experience he describes as "transcendent"; thus God is transcendent, un-



Immanuel Kant.

to do. His chief writings were *Critique of Pure Reason*, *Theory of Ethics*, and *Critique of Judgment*. See also *ÆSTHETICS*.

Kaolin (or *China Clay*), is hydrated aluminium silicate, and is a white, crumbly material occasionally found crystalline, when it is called kaolinite. It is also worked in England, the United States, France, China, and Malaya, and is used for the manufacture of white porcelain and china, for which the clay must be iron-free.

Kaolinite, see **CLAYS**.

Kapok, a stuffing for mattresses and similar articles, valuable for its qualities as a water-resister and heat-insulator. It is derived from the silky fibres covering the seeds in the large pod of the tree *Ceiba pentandra*, which grows in Java.

Kapp, Edmond Xavier (b. 1890), caricaturist and artist, born in London. He has frequently exhibited at London

galleries, and has published lithographs and books of drawings, among which are two series of *Twenty-four Drawings* (1919 and 1922), and *A Music-room Book* (1926).

Karachi, seaport in Sind, India, N.W. of the Indus delta. The harbour is well situated and modern equipment is installed for dealing with cargoes. Much of its importance is due to the Sind wheat and cotton crops which, under several irrigation schemes, have increased considerably. Karachi is also an air-port. Pop. (1931) 263,565.

Karageorge (George Czerny) (1766-1817), Serbian leader, born of peasant family and nicknamed Black George (Karageorge) from his swarthy complexion and surly manner. After working for a while with a Turkish brigand, he joined an Austrian frontier regiment and fought in the Turkish War (1788-91). He then led the Serbs unofficially against the Turks and, after his courage and bravery had brought several successes, attempted with the help of Russia to make Serbia independent. After taking Belgrade in 1806, he was declared hereditary ruler by the Serbs in 1808, but was forced to fly to Hungary after the Turkish victories of 1813. He tried to instigate another Balkan insurrection in 1817, but was murdered in his sleep, probably at the instance of his rival Miloš Obrenović.

Karakorum (or *Mustagh*), mountain range in C. Asia, stretching 450 m. from the Pamirs to the Himalayas across the N.E. part of Kashmir, and connecting the Himalayas with the Hindu Kush. The highest peak is K2 (*q.v.*) or Godwin-Austen.

Karamzin, Nikolai Mikhailovich (1765-1826), Russian author, travelled widely in Europe, and published his observations in his *Letters of a Russian Traveller* (1797-1801). He contributed many short stories and essays to the *Moscow Journal*, which he edited. His great work is a *History of the Russian Empire* down to 1613.

Kara Sea, part of the Arctic Ocean, between Novaya Zemlya and N.W.

Siberia. It is navigable only between July and Sept., when it provides a convenient route to N. Siberia from European Russia.

Karelia, an autonomous republic in the R.S.F.S.R., with Finland on its W. side, Murmansk N., and the White Sea as its E. frontier. It is an area of lakes and marshes, the largest lake being Lake Onega, which is 3763 sq. m. Nearly half the scattered population is engaged in fishing. Industries are very small—forestry and its by-products, brewing, cloth works, and grain-milling, all of which are in Petrozavodsk, the capital. The province lacks education facilities (adequate sanitary conditions), and food supplies. Area, 56,120 sq. m.; pop. c. 268,000.

Karl I (1887-1922), Emperor of Austria-Hungary, succeeded his grandfather, the Emperor Francis Joseph, in 1916, having served in the War against Italy. His reign was marked by weakness and indecision. He alienated the Germans by concessions to the Slavs, which came too late to obtain their support, and made abortive efforts to bring about a peace. He abdicated in 1918. In 1921 he made a futile attempt to regain the Hungarian half of the Dual Monarchy.

Karlovy Vary, see CARLSBAD.

Karlskrona, Swedish port on the Baltic. Chief naval station of the Swedish fleet; it has excellent dry docks, and fine arrangements for slipping naval craft. Pop. (1932) 25,684.

Karlsruhe, capital of the Free State of Baden, Germany. Main industries are brewing, soap and perfumery works. There are also paper manufacturing, marble and concrete works, sewing machine factories, and the "Karlsruhe-Berlin" metal industry. It is the last German inland port on the Upper Rhine. Pop. 156,433.

Karma, term used in Indian philosophy and religion to signify the accumulated effect of the good and bad deeds of an individual during a single life or series of lives. The idea of Karma is

closely bound up with that of reincarnation (*g v*); it is supposed that the status of a newly born creature is determined by the degree of goodness or badness of his balance of Karma at the conclusion of his previous existence. Karma plays an all important part in Buddhism and Theosophy (*g v*).

Karnak, village on the Nile. With Luxor it forms the old city of Thebes, Upper Egypt. It is renowned for its



Pyton erected at the Temple of Khonsu (XXth Dynasty) at Karnak by Tishasty I (c. 1250 B.C.).

temples, especially those of Khonsu and Amen. All that remains of the latter is the hypostyle hall with its flat stone roof supported by 12 central columns with sculptures of historical events.

Károlyi, Michael, Count (b. 1875), Hungarian politician, descended from a rich and noble family. Elected to Parliament in 1905 as a Liberal, he formed an Agrarian Centre Party in 1909, and later moved across to the left wing. He was arrested in France on the outbreak of war while working

for a Russo-Hungarian alliance. On being released, he returned to Hungary, founded his own party, and tried to break with Germany and make a separate peace. He formed a National Council in Oct. 1918, and on the day after the Revolution of Oct. 30 was made Prime Minister in the name of King Charles, to whom he swore allegiance. A fortnight later the Hungarian People's Republic was formed under the Károlyi Cabinet, and in Jan. 1919 Károlyi himself was officially appointed President. After a brief attempt to inaugurate reforms and negotiations, his Government fell in the Communist revolution under Béla Kun in March. On the eve of the White counter-revolution, Károlyi left the country, and in his absence was found guilty of high treason and his estates confiscated. He has since lived in Italy, Austria, U.S.A., Russia, and France. He published an autobiography, *Fighting the World*, in 1926, and is one of the editors of the *Paris Monde*.

Karoo, large plateau area in Cape Province, S. Africa, between the Orange R. and the coast.

Kars: (1) Vilayet in Asiatic Turkey. Occupations are agriculture and stock-raising. Its most valuable mineral is salt. Under the Berlin Treaty, after the Russo-Turkish War 1877-8, it was transferred to Russia, but in 1921 was returned under treaty with the U.S.S.R. to Turkey. It was once part of Armenia under the Bagratid Princes. Area 5575 sq. m.; pop. 205,000.

(2) Capital of vilayet. Its only industries are carpet-making and rough woollen goods. The citadel has been the central point of considerable fighting with Turks, Mongols, Persians, and Russians. Pop. 14,000.

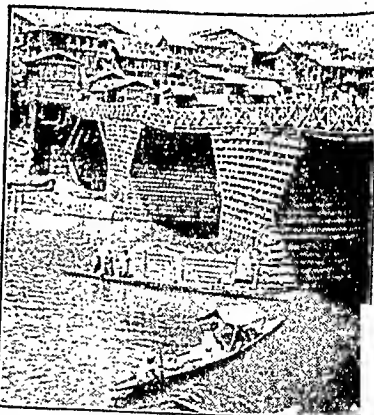
Karsavina, Tamara, Russian dancer, pupil of the famous Imperial School of Ballet, St. Petersburg. She first appeared in London at the Coliseum in 1900. She later joined the Imperial Russian Ballet Company, then making its first triumphal visit to

London, in 1911, and became a great favourite in such ballets as *Scheherazade*, *Les Sylphides*, and *Le Spectre de la Rose*. She danced in several post-War seasons of Russian Ballet in London, and, like Lopokova, has interested herself in the development of English Ballet. Her book of memoirs *Theatre Street*, was published in 1929.

Karyokinesis, see CELL.

Kashgar, town in Sinkiang, Chinese Turkestan, on a trade route between India, China, and Asiatic Russia. Its most important production is wool, which is of high quality. Rice, wheat, and barley are cultivated, and large quantities of fruit. Cotton and woollen goods for home consumption are made. Mining on a small scale for copper-ore is carried on by natives. Pop. c. 80,000.

Kashmir (or *Cashmere*), a native State N.W. of India, officially styled Jammu and Kashmir. It lies among the Himalayan ranges, and embraces the upper valleys of the Jhelum and



Bridge and houses at Srinagar, Kashmir.

Indus with their tributaries. The surface is very mountainous, with fertile valleys in the S., of which the so-called "Happy Valley" of Kashmir (drained by the Jhelum) is the most important, forming the nucleus of the

State. The S. mountains are of moderate elevation, and well forested with pine, deodar, etc., they are visited by many Europeans in the hot season. The outlying districts of Ladakh, Baltistan, and Gilgit in the N. are occupied by immense glaciated ranges culminating in Nanga Parbat (26,200 ft.) near the Indus gorge.

Population and Production. The population is densest in the Kashmir and other S. valleys; among the northern mountaineers life is a struggle for bare subsistence. The principal products of the S. are rice, raw silk, cereals, fruit, and vegetables. The manufacture of textiles is the most important industry. Kashmir shawls long had a great reputation, but the demand has declined, and the industry has, to some extent, been replaced by the weaving of carpets. The bazaars of Srinagar are celebrated for their wood-carving and shagreen work. Srinagar (173,000) is the chief town.

Communications. Kashmir is of considerable strategical importance from its position astride the principal passes from N.W. India to central Asia.

Government, Religion, and History. Kashmir is governed by a Hindu dynasty of Maharajas, and British interests are represented by a Resident at Srinagar. Although the ruling caste are Hindus, most of the inhabitants, save in Ladakh (q.v.), are Mohammedans. In early times the Hindu culture prevailed and Buddhism made some progress; the ruins of some handsome temples of this period remain. This Hindu civilisation was destroyed by Mohammedan dynasties after the 13th cent., and in 1581 Kashmir became part of the Mogul Empire. In 1756 it was incorporated in the Durani (Afghan) Empire. The Sikh conquest began in 1819, and by 1820 Kashmir had become a feudal dependency of the Punjab. The British, after their defeat of the Sikhs in 1846, established the feudatory Sikh dynasty of Gulab Singh as an

independent power. Area, 84,250 sq. m.; pop. (1931) 3,646,200.

CONSULT: *Annual Report of the Administration of Jammu and Kashmir*; W. R. Lawrence, *The Valley of Kashmir*; C. F. Tyndale Biscoe, *Kashmir in Light and Shade*.

Kasi, see BENARES.

Katanga, S province of the Belgian Congo. Physically the region resembles the Rhodesian veld, is good in parts for agricultural pursuits, and has considerable stretches of pasture-land on the plateau. In mineral resources Katanga is well endowed, the copper mines near Kambove being highly important. There are also tin, uranium, cobalt, platinum, and diamonds, with gold workings at Ruwi, in the province. In the highlands, which are immune from the tsetse-fly, cattle thrive. Elisabethville is the capital, and there are several educational institutions there. Area, c. 180,000 sq. m.; pop. c. 1,000,000.

Kataphoresis, see COLLOID CHEMISTRY; ELECTROSMOSE.

Kata Thermometer, an apparatus for the measurement of the cooling power of air, particularly in factories, schools, and other places where human health is affected by atmospheric conditions. It consists of an alcohol thermometer with a large bulb, which is heated to a temperature of 100° F. and then allowed to cool, the time for it to cool from 100° to 95° being taken by a stop-watch.

Kater, Henry (1777-1833), English physicist, born in Bristol and educated at Sandhurst. He outlined the principle of reflecting telescopes, and experimented to determine the length of the seconds-pendulum. He assisted in the great trigonometrical survey of India until 1808.

Kathiawar, a peninsula on W. coast of India, Western India States, between the Gulfs of Cambay and Cutch. The political agency of Kathiawar has an area of 21,000 sq. m. Cotton is cultivated. There are 3 ports, Porbandar, Mangool, and Veraval. There is an extensive and well-run

railway system. The peninsula is rich in antiquities, an outstanding relief being the extraordinary rock inscription at Asoka. Pop. c. 2,540,000.

Kathmandu, capital of Nepal State, India. It is an attractive town with numerous houses having carved dormer windows and elaborate wooden balconies, mostly of uncertain age. There are also many temples. Pop. c. 108,800.

Kato, Taka-Akira, Viscount (1859-1926), Japanese statesman. He became Private Secretary to the Minister of Foreign Affairs in 1888. Director in the Finance Department (1891-4), envoy-extraordinary in London (1894-9), and Minister for Foreign Affairs (1900-1 and 1906), resigning as a protest against the nationalisation of the railways. He became Ambassador to London (1908-13), and was twice Foreign Minister before being made Viscount in 1916. In 1924 he became Prime Minister of Japan, and introduced manhood suffrage before his death in office (1926).

Katrine, Loch, principally in Perthshire, the lesser portion being in Stirlingshire. It is the chief source of the Glasgow water supply. Ellen's Isle, with its surrounding scenery, is depicted by Scott in his *Lady of the Lake*. Area, 5 sq. m.; length, 8 m.; maximum depth, 495 ft.

Kattegat (or *Cattegat*), an arm or sound between Sweden and Denmark, on the North Sea. It extends 160 m., and is shallow and difficult to navigate.

Kattowitz (*Katowice*), town on the Rawa, Poland. There are ironworks and foundries and a developing mineral output from zinc and anthracite mines in the outlying districts. Kattowitz was formerly included in Silesia, and at the partition of 1921 was given to Poland. Pop. (1931) 127,840.

Kauffer [kou'fū], **Edward McKnight** (b. 1890), American painter and designer, was born in Montana and studied art in Chicago before coming to Europe, where he worked in Paris and Munich, and finally settled in London during the World War. The development of modern poster art offered him a field in

which he rapidly rose into the first rank. He edited *The Art of the Poster* in 1921 and has illustrated and decorated a number of books, including Burton *Anatomy of Melancholy*.

Kaufmann, Angelica (1741-1807), Swiss painter. Her father was an artist, and she showed great precocity as a child in both music and painting, having gained a considerable reputation as a portraitist by the age of 12. After travelling in Italy, she came to England in 1766 and speedily won great popularity and renown. She was closely associated with Reynolds and was one of the foundation members of the Royal Academy. In the National Portrait Gallery are portraits by her of herself and Benjamin West.

Kauri Gum, a resinous material obtained as an exudation from the Kauri pine, a coniferous tree native to New Zealand. Kauri gum is utilised in the compounding of numerous varnishes, and in the manufacture of linoleum. See also CORAL.

Kauri Pine, a coniferous tree (*Agathis australis*) growing to 140 ft. in New Zealand. Trunks have been obtained 50 ft. long with a diameter of 4 ft. throughout the length. The timber is almost free from knots, straight-grained, strong and durable, and is highly esteemed for masts, spars, etc.

Kavalla, port on Gulf of Kavalla, Aegean coast, Greece. It is in the S. of the Drama province, formerly part of Macedonian Turkey. Its chief export and industry is tobacco, the country inland producing crops of very fine quality. Its position between the Mesta and Struma valleys, and the shelter it receives from the island of Thasos, render it a possible roadstead. The port was won by Greece during the Balkan War (1912-13). Pop. c. 50,000.

Kavirondo, Gulf of, inlet on N.E. of Lake Victoria Nyanza, Kenya, which gives its name to the surrounding district.

Kay, Joseph (1821-1878), English economist, called to the Bar in 1848, and made Queen's Counsel in 1869. He wrote extensively on social con-

ditions in Europe, especially on those of the poor. His best-known general works are: *The Education of the Poor in England and Europe* (1846), *The Social Condition of the People in England and Europe* (1850), *The Condition and Education of Poor Children in English and German Towns* (1853).

Kayak (or *Cayak*), an Eskimo fishing canoe, consisting of a light wooden framework covered with seal-skins, in which the passenger is so tightly laced that the whole is waterproof. It is propelled by paddles. The word strictly applies only to the boat used by men, the women's being termed *umiak*.

Kaye-Smith, Sheila (*Mrs. Theodora Fry*), English novelist, is the author of *Three Against the World* (1914), *Tamarisk Town* (1910), *Iron and Smoke* (1928), *Susan Spray* (1931), and many other popular novels, most of them dealing with the Sussex countryside.

Kayser, Heinrich Gustav Johannes (b. 1855), German physicist. A professor at Bonn (1894-1920), he is chiefly known for his work on spectroscopy, of which he has given accounts in his many textbooks and reports.

Kazakhstan, an autonomous socialist Soviet republic (1920), bounded on the S. by Uzbekistan and Turkmenistan, with the Caspian Sea on its E. side. In the valley of the Urali cultivation is intensive, wheat being the major crop of the republic, oats, ye, hemp, millet, and cotton and rice and opium poppies are all cultivated. Trade in furs is carried on, and fishing flourishes. Although this country is rich in minerals, the copper mines alone are economically exploited. Industries are printing, tanning, carpet-weaving, and woollen garments. From the Kara Bugaz Gulf, Glauber's salt is obtained. Considerable attention is paid to cattle-breeding. The Kazaks have numerous Turkish affinities, and those in the Steppe area are mainly of pastoral habit. There are a number of towns in Kazakhstan,

the largest being Semipalatinsk, which has a population of over 50,000. On the Caspian are the two small ports of Guryev and Alexandrovsk. Railway communication is inconsiderable, transit being chiefly by oxen and camel caravan. The republic contains the Sea of Aral and Lake Balkhash. Area, 1,151,000 sq. m; pop. (1926) c. 6,500,000.

Kazan, chief city and port of the Tatar Autonomous Republic, R S F S R. Leather is the oldest and most productive industry, with soap and toilet requisites a good second. Other manufactures are machinery, textiles, and tobacco. At the old and famous university Lenin was a student. It is a city of gleaming minarets and gilded cupolas. Lower down the Kazanka R. is Ulanovsk, Lenin's birthplace, formerly Simbirsk, but renamed in his honour. Pop. 179,200.

Kazvin, a province in N.W. Persia. Grain and fruit production are the main industries, large quantities of fruit being dried and packed for export. Kazvin, its chief town, is c. 100 m. N.W. of Tehran, at the S. slopes of the Elburz Mountains. Carpets are manufactured in the town, and raw silk and rice also find a market there. Road improvement has increased the value of the markets at Kazvin, and trade is developing. A mosque was built here by Harun-al-Rashid. Pop. of town, c. 41,800.

Kea (or *Mountain Kaka*), parrot found in the S. Island of New Zealand, mostly on the mountain-sides above the forest. It is about the size of a large crow, its colour is bronze green, and its beak is rather long and slender for a parrot. The natural food of the bird is roots, grasses, fruits, and insect grubs, but since the introduction of sheep it has become a serious pest to the farmer by attacking them.

Kean, Edmund (1787-1833), English actor, made his first appearance on the stage at the age of 3, and played Hamlet at 14. His fame was established by his performance of Shylock at Drury Lane in 1814. In 1820 he paid a successful visit to the U.S.A.

Kean excelled in Shakespearean tragic rôles, and was playing Othello at Covent Garden in 1833, when he was taken ill on the stage, and died soon afterwards. His son CHARLES KEAN (1811-1868) was also an accomplished actor.

Keats, John (1795-1821), English poet, one of the greatest of the English Romantics, was of humble birth, and was designed to be an apothecary; but his schoolmaster's son, Cowden Clarke, introduced him to Leigh Hunt, and he began his literary career under Hunt's guidance and influence. Through Hunt he met Shelley and Haydon, the former assisting in Keats's first publication, *Poems* (1817). *Endymion*, which appeared in 1818, evoked savage criticism from the *Blackwood* and

Quarterly magazines. In 1820 his second volume of *Poems* appeared, comprising all his best work, except *La Belle Dame Sans Merci*. It contained *Lamia*,



John Keats.

Isabella, *The Eve of St. Agnes*, the *Odes* and *Hyperion*, a fragment. Keats was now stricken with consumption, and went to Italy in the hope of a cure, but he died in Rome on Feb. 23, 1821. His best-known works are probably the sonnet, *On first looking into Chapman's Homer*, the *Ode to a Nightingale* and *Ode on a Grecian Urn*, and *La Belle Dame Sans Merci*. They are marked by a perfect poetical sense of beauty in words and sounds, a vivid imagination, and a rich descriptive power. Much of the emotion in his work may have been due to his love for Fanny Brawne, but it is probable that her effect on his work has been overrated. His *Letters* comprise perhaps the completest commentary on his life, character, and art.

Keble, John (1792-1866), English

poet and divine, was one of the founders of the Oxford or Tractarian movement. His sermon on *National Apostasy* (1833), his contributions to *Tracts for the Times*, and his poems in *The Christian Year* (1827) (some of the latter being still in common use as hymns), were among the important literary results of that movement.

Keeskomet, an agricultural region S.E. of Budapest, Hungary, specially noted for its fruit culture. Its industries are tanning and milling; stock-rearing is increasing. Its outstanding building is the theatre. Pop. (1930) 79,460.

Kedah, see MALAY STATES.

Kedgerree, Indian dish of fish and rice, curried. The name is also given to a mixture of rice, dates, onions, and ghee, flavoured with various spices. In England, a kedgerree usually consists of fish, rice, hard-boiled egg, mixed with butter and seasonings, and rennet, garnished with parsley, as a breakfast-dish.

Keel, the heavy foundation plate or beam from bow to stern of a ship which holds the side ribs in position and projects down like a fin to give stability. Yachts carry deep heavy keels to balance masts and sails. The word was used by the Vikings to mean a complete ship.

Keeling Islands, see COCOS ISLANDS.

Keene, Charles Samuel (1823-1891), English illustrator, well known as a contributor to *Punch*. He also drew for *Once a Week* and illustrated *The Cloister and the Hearth* (Charles Reade) and *Evan Harrington* (George Meredith) as well as other works.

Keep, see DUNGEON.

Keeper of the Great Seal, term for the British officer of State who holds the Great Seal, and was formerly called the Lord Keeper, but is now the Lord High Chancellor. The Seal is used for sealing important public documents, such as treaties, the operation of sealing being performed by the Clerk of the Crown in Chancery, but it is now to a large extent superseded by wafer great seals made on embossed paper or on

wax. Treaties with foreign Powers are still ratified by Letters Patent under the Great Seal. On the death of the sovereign, the obsolete seal is replaced by a new one, and becomes the property of the Chancellor.

Kei Islands, a group of the Moluccas, Dutch E. Indies. Rice and maize are cultivated, while yams and plantains grow freely. Area, 580 sq. m.; pop. c. 36,000.

Keighley, borough and market town, W. Riding of Yorkshire, near Bradford and Leeds. It is a great woollen and worsted centre. Textile machinery, looms, and bobbins are manufactured. Pop. (1931) 40,440.

Keith, Sir Arthur (b. 1866), English anthropologist, was born at Old Machar, Aberdeen. He studied medicine, and became an expert in morphology, reconstructing prehistoric man from fragmentary skeletal remains. He held several important lectureships, was attached to numerous societies, elected F.R.S. in 1913, and was knighted in 1921. He has published several works on morphology.

Kekulé von Stradonitz, Friedrich (1829-1896), German chemist who made contributions of enormous importance to the theories of organic chemistry. He studied for some time under Liebig, Dumas, and others in Paris. He became Professor of Chemistry at Ghent in 1858, in 1867 he was appointed to Bonn, and remained there till his death.

Keller, Gottfried (1819-1890), German author, was born in Switzerland. His poems, *Gedichte* (1848), his best novel, *Der Grüne Heinrich* (1851-3), and his short stories (e.g. *Die Leuteron Seldayla*, 1856 and 1874) demonstrate a sensitive and emotional nature.

Keller, Helen Adams (b. 1880), American writer who, though she became blind, deaf and dumb in infancy, was taught to read and write, and graduated from college with distinction. She has published several books, including *The Story of my Life* (1902), *The World I Live In* (1910), and *Midstream* (1929), and is a

remarkable example of the results obtained by modern educational methods in overcoming natural drawbacks.

Kellogg, Frank Billings (b. 1856), American diplomat and lawyer. He acted for the United States in the Standard Oil case, and in several important railway actions. He was delegate to the Republican National Convention in 1904 and following years, and senator 1917-23; he represented the United States at the 5th American International Conference at Santiago (1923). He became Ambassador to Great Britain in 1924, but returned to become the Secretary of State (1928-9). By his efforts, the Pact of Paris (popularly known as the Kellogg Pact), which renounces war as an instrument of national policy, was signed by 15 nations in 1928.

Kellogg Pact, see DISARMAMENT.

Kelp, a word used to describe the ash obtained from burning various kinds of seaweed; the word *rarech* is employed in Normandy for the same purpose. Kelp was for a long time of commercial importance as practically the sole source of iodine (q.v.), but in recent years its use has considerably diminished, as iodine can now be obtained from Chile saltpetre deposits.

Kelpie, in Scottish folk-lore, a spirit that was supposed to frequent fords and rivers on stormy nights, and to make itself apparent to those about to be drowned. Sometimes it was regarded as harmful in itself. It usually appeared in the form of a horse.

Kellie, Sir John Scott (1810-1927), English geographer. He was editor of the *Statesman's Year-Book* (1880-1926), librarian and secretary of the Royal Geographical Society, and joint editor of the *Geographical Journal*. Of his many works, the best known is *The Partition of Africa* (1894).

Kelvin, William Thomson, 1st Baron (1824-1907), British scientist, born at Belfast. He took his degree at Cambridge, in 1845, and went to Paris to study physics under Regnault. In 1846 he accepted the Chair of Natural

Philosophy at Glasgow, which he held for 53 years.

He is best known for researches in electrical science and his work for the improvement of submarine cables. Not only the modern compass, but the sounding apparatus, instruments for



Lord Kelvin.

calculating position at sea, and many other nautical appliances were invented by him.

He was knighted in 1860, and in 1892 raised to the peerage.

Kemble, John Philip (1757-1823). English actor, brother of Mrs. Siddons (q.v.), with whom he first appeared at Drury Lane in 1783 in *King John* and Moore's *Gamester*; established a reputation second only to his sister's by his performance of *Macbeth* in 1785. Manager of Drury Lane from 1788 to 1802, and of Covent Garden from 1803 till his retirement in 1817. FRANCES ANNE ("FANNY") KEMBLE (1809-1893), was the daughter of John's brother CHARLES (1775-1854), who was also a distinguished actor, and manager of Covent Garden. She first

appeared as *Juliet* in 1820, and at once achieved great popularity; author of several volumes of reminiscences.

Kempis, Thomas à (1380?-1471). German divine and writer, was born at Kempen, his surname being Hammerken. He studied at Deventer, and entered the Augustinian convent of Monnt St. Agnes in 1399. There he wrote many works, biographies, advice to the monks, and didactic essays on varied subjects. His best-known work (though its attribution to him is not unquestioned) is the famous *Imitatio Christi*.

Kempton Park, a district of Sunbury, Middlesex, England, mentioned in Domesday. It became Crown property in 1104, and the manor house was used as a royal dwelling until the time of Edward III. No trace of the palace now remains. The park has an area of c. 500 acres, 300 of which constitutes a racecourse, on which are run the Great Jubilee Handicap in spring and the Duke of York Handicap in autumn, and other races.

Kemp-Welch, Lucy Elizabeth (b. 1869). English painter. She first exhibited at the Academy in 1894, and has gained many distinctions, including the Presidency of the Society of Animal Painters in 1914. Her paintings of horses are well known and popular. Her *Horses bathing in the Sea* (1900) and her *Forward, the Guns* (1910) may be mentioned as typical examples. Her work can be seen in the Tate Gallery and the Imperial War Museum, as well as in provincial galleries.

Ken, Thomas (1637-1711), English divine and hymn-writer, was one of the seven non-juring bishops (1688), and was deprived of the see of Bath and Wells for declining to take the oath of allegiance to William of Orange. His hymns include the famous *Awake, my soul, and with the sun and Glory to thee, my God, this night*, of which the concluding verse, *Praise God, from Whom all blessings flow*, is a common doxology. His best-remembered prose work is *The Practice of Divine Love* (1685).

Kendal, Ehrengarde Melusina, Duchess of (1607-1743), chief mistress of George I of England, came to this country in 1714. She was made Duchess of Munster (1716), of Kendal (1719), and Princess of the Empire (1723). She is best remembered for selling the patent rights of Irish copper coinage to William Wood and for the scandal of Wood's halfpence that followed. She had two children by the King, one of whom married the Earl of Chesterfield, the other becoming Countess of Lappe.

Kendal, William Hunter (1843-1917), English actor, first appeared on the stage at Glasgow in 1862 as Louis XIV. After his marriage in 1869 he was associated with his wife, DAME MARGE KENDAL (b. 1849), sister of T. W. Robertson, the playwright, chiefly at the Haymarket, in Shakespeare and the comedies of Sheridan and Goldsmith.

Kendal, town, on the R. Kent, Westmorland, England. Its manufactures include woollen goods, hosiery, leather goods, and some gunpowder. Horse and cattle fairs are held annually. Catherine Parr was born at Kendal Castle, now in ruins. There are a double-aisled Gothic church dating from the 13th-15th cent., and a 16th-cent. grammar school. The coarse serge known as "Kendal green" is no longer made. Pop. (1931) 15,575.

Kendall, Henry Clarence (1841-1882), Australian poet, was made Inspector of Forests (1873). His works include *Leaves from an Australian Forest* (1869) and *Songs from the Mountains* (1880).

Kenilworth, town in Warwickshire renowned for its castle, partly built by John of Gaunt, and partly by Henry VIII and the Earl of Leicester. Elizabeth visited it on several occasions. During the Civil War it was considerably damaged by Cromwell's troops. Merwyn's Tower figures in Scott's *Kenilworth*. Pop. (1931) 7592.

Keng-tung, see TUNG-KENG.

Kennel, see DOGS, CARE OF.

Kensington, borough of London, W.

of Westminster. It has been the home of many famous people, including the Earls of Holland and Lord Leighton, whose house is now an art gallery. At the W. end of Kensington Gardens is Kensington Palace, the residence of Queen Victoria before her accession. S. Kensington contains the Science, Victoria and Albert and Natural History Museums, and the Imperial Institute. The headquarters of the University of London and colleges of science and music are situated here. Pop. (1931) 180,681.

Kent, Earls and Dukes of. The title of Earl was held by several families; Odo, Bishop of Bayeux was the first earl. From 1301 to 1408 the earldom was held by Edmund, brother of Edward II and his heirs. In the 15th cent. the title was held by the Nevilles; and in 1463 it was revived for Lord Grey of Ruthin. The 12th earl became Duke of Kent in 1710, and the family held the title until 1710. In 1709 Edward Augustus, son of George III, was created Duke of Kent. He died in 1820 and the title lapsed. His only child became Queen Victoria.

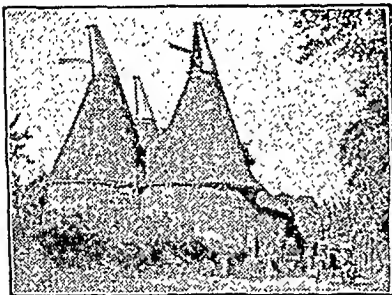
Kent, William (1684-1748), English artist and landscape gardener, is referred to by Horace Walpole in his *Letters of Painting* and was patronized by Lord Burlington. He was responsible for the bad Shakespeare statue in Westminster Abbey, but is supposed to have exercised a good



(By courtesy of the L.N.S. Art, Kenilworth Castle.)

influence on the art of landscape gardening in England.

Kent, maritime county of S.E. England, bounded N. by the river Thames and the North Sea, E. and S.E. by the Straits of Dover, W. by Surrey, and S.W. and S. by Sussex. Area, 1552 sq. m.; pop. 1,218,600. The N. Downs, running through part of the county, are of chalk, and are covered with short grass, which affords pasturage for sheep. The Weald of Kent lies between the N. and S. Downs. A great part of the Weald is cultivated, hops and cereals forming the main crops. Romney Marsh is famous for its sheep. The climate is good, the seaside resorts are very



Oast Houses, Kent.

sunny and bracing, and the fruit and nuts among the finest in England. The industries are associated with minerals, agriculture, and manufacture. Good building stone is found in the Maidstone area, and coal is worked. Wheat, oats, and barley are the main crops; roots and fodder, potatoes and vegetables for the London market, with a special cherry and strawberry season comprise the important features of agricultural production. Hop-culture is now (1933) showing signs of returning to prosperity.

Of the manufactures several are closely allied to the building trades: cement on the Medway; bricks, tiles, and drain-pipes are made near Sittingbourne, Rochester, and Aylesford. Lime comes from the Gravesend area.

Paper manufacture is an old and important industry. At Dartford gunpowder is made, and the Royal Arsenal is at Woolwich. There are naval dockyards at Chatham and Sheerness, the former being one of the principal naval commands (the Nore) in England. Shipbuilding is carried on at Dover and on the Thames and Medway. A well-known make of steam-roller comes from Rochester; where there are also important aeroplane works. Whitstable oysters are sought after by epicures.

Kent has two islands, Sheppey and Thanet (the latter no longer a true island), and two cathedral cities, Canterbury and Rochester. There are several watering-places, including Margate, Folkestone, Ramsgate, Broadstairs, and Herne Bay; and Tunbridge Wells is a Royal spa.

Kentish Petition, initiated by the Grand Jury of Kent and presented to Parliament in 1701, protested against the peace policy of the Tories and seconded William III in his opposition to Louis XIV of France.

Kentucky, an inland State of the U.S.A., bounded on the N. by the Ohio R., on the S. by Tennessee, on the W. by Missouri, Illinois, and Indiana, and on the E. by Virginia. The surface is hilly, rising in the E. to the Appalachian Mountains. The State is well watered, having c. 800 m. of navigable waterways. Kentucky is famous for its grazing lands, an exceptional breed of horses being raised on the "blue grass" region in the N. The forests are important, especially for hardwoods. Principal agricultural crops are cereals and tobacco. Coal and petroleum are the most valuable minerals. There is a remarkable series of caves, subterranean galleries extending over 9000 sq. m. in the centre of the State. The Mammoth Cave, with 150 m. of passages, is to be a National Park. The chief towns are Frankfort, the capital (6500), Louisville (307,700), Covington (65,300), and Lexington (45,700). There are universities at Lexington and Louisville.

Kenya

Area, 40,393 sq. m.; pop. 1,250,000, 2,614,589.

Kenya, British Colony and Protectorate of E. Africa, located N. by Abyssinia, S by Tanganyika Territory, W. by Uganda, and N.E. by Italian Somaliland, with the Indian Ocean on its S.E. fringe. The Protectorate includes the mainland dominions of the Sultan of Zanzibar. Area, 225,000 sq. m.; pop. (estimated 1931) 3,040,940, including 16,812 Europeans.

Large areas are under cultivation. In the highlands, climatically suited to white settlers, coffee, maize, wheat, sisal, and tea form the major crops. In the tropical zone cotton, rubber, sugar, and coconuts yield the best results. Other crops are potatoes, tobacco, ground nuts, barley, and beans. The bulk of manual labor is done by natives.

Stock-raising and dairy farming on large farms are being rapidly developed, with export of hides. The 1300 sq. m. of forest-land include mahogany, ebony, teak, camphor, and African cedar. The large bamboo is being used for paper-making. Mineral deposits are undeveloped, except those of gold and marble. Kenya exports cotton, coffee, fibres, maize, hides and skins, ivory, timber, bark for tanning, refined sugar, butter, tin-ore, wool, and potatoes.

In conjunction with Uganda a large number of small State-owned railways from 6 m. to 886 m. in length, serve most of the area. The main ports include Mombasa (pop. 40,000), and Kilindini Harbour, the finest on the coast of E. Africa. Communications are maintained by a fleet of small steamers, chiefly British. Steamboat services operate on Lakes Victoria and Albert. The roads are fairly good, and a motor road extends from Nairobi across Uganda to the Sudan. The Tana, chief river, is navigable for 400 m.

Pagan religions prevail, with Mohammedanism along the coast. Christian missions are established. In 1931, of the 65 schools under Government supervision, 10 were under Government

control. The British Government assumed control of the area in 1903. In 1905 the East Africa Protectorate, as it was then known, was placed under the control of a Governor and Commander-in-Chief. In 1920 it was annexed to the Crown and, with the exception of the Zanzibar areas, proclaimed the Kenya Colony and Protectorate. During 1924 a parliamentary commission investigated the best methods of developing Kenya, and in 1925 another Commission was appointed to



A street in Mombasa, Kenya

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Keratin, an albuminous protein found in the horny parts of animals, such as the nails, horns, feathers, and also in the hair.

Kerbela (or *Karbala*), town on the

Husainya Canal, 55 m. S.W. of Baghdad. The majority of the population are Persians. It is a pilgrimage centre, a holy place, and a "desert port." The town centre is the shrine of the murdered Husain, and the pilgrimage is directed to its gilded minarets. Pop. c. 55,000.

Kerch (or *Kertch*), Russian port at the N. end of Kerch Strait as it turns into the Sea of Azov. The industries are well distributed: fishing on the coast, with a good caviare and sturgeon trade; wheat is grown in the district; hides, wool, and linseed are other exports. The harbour is spacious, with several quays capable of dealing with vessels of full draught. Its buildings include a Byzantine church and a fortress. Many discoveries of archaeological value were made in Kerch and district during the nineteenth century. Pop. c. 35,000.

Kerensky, Alexander Feodorovich (b. 1881), Russian politician, studied law and became a barrister. He joined the Social-Democratic Party, and was elected to the Duma as a moderate Socialist. At the beginning of the revolution in 1917 he became Minister of Justice, and later Prime Minister of the second Provisional Government, but found it very difficult to steer a middle course between the forces of militaristic reaction headed by Korniloff and the growing Bolshevik element supported by Lenin and Trotsky. In Sept. 1917 Kerensky proclaimed a Republic, and assumed command of all the Russian troops. The power of the Bolsheviks increased, and the Bolshevik revolution overthrew his government in Nov. Kerensky fled, and after a few attempts to recover power, left the country, and retired to Paris. He has written *The Prelude to Bolshevism* (1910), and *The Catastrophe* (1927).

Kerman (or *Kirman*): (1) an extensive S.E. province of S.E. Persia bordering on British Baluchistan. There are large tracts occupied by desert or lofty mountain ranges. The melting snows from the higher peaks irrigate a number of fertile areas. Salt marshes are characteristic of some districts.

Cotton, cereals, and opium are the chief crops. The Kerman shawls, made from goat hair, are celebrated for their softness of texture and richness of design. The port of Bandar Abbas is the chief commercial centre, but its trade is declining. Pop. c. 650,000.

(2) The capital of (1), situated among hills 5700 ft. above the sea. It is an important centre for the weaving of carpets and shawls. The oldest buildings date from the 11th cent. A.D., but the old town was ruined by an earthquake in 1704. Pop. c. 35,000.

Kermanshah; (1) Province, S. of Kurdistan, Persia. One of the most fertile regions in Persia, the Kurds having large areas under cultivation with crops of rice, maize, wheat, fruit, and poppy-seed. Pop. (estimated) c. 400,000.

(2) Capital of above, on the great trade route from Teheran to Bagdad. Pop. c. 60,000.

Kermes, a substance formerly used as a crimson dye, and in medicine as an astringent. It is produced by a scale insect (*q.v.*) which infests oak trees, particularly in Mediterranean countries.

Kermesse [*kārn'zēs*] (*Kermis* or *Kirness*), i.e. *Kirkmass*, the mass celebrated on the anniversary of a church's foundation; also a fair held in Holland, Belgium and parts of France, on the feast day of a patron saint of a church.

Kernahan, Coulson (b. 1858), English novelist. His works include *A Dead Man's Diary* (1890), *Scoundrels and Co.* (1901), and *Good Company* (1917).

Kerosene, a mineral oil mixture, having boiling-point limits of approximately 150-300° C., is obtained as the second main fraction in the distillation of petroleum (*q.s.*), and is employed principally as an illuminant, being also known as burning or illuminating oil.

Kerr Effect, see **KERR CELL**; **TELEVISION**; **MAGNETO-OPTICS**.

Kerry, county in the province of Munster, Irish Free State. Its W. border is heavily indented by the Atlantic, and the interior is boggy,

rugged, and mountainous. Macgillcuddy's Reeks in the W. reaching a height of 3414 ft. At one period there was a considerable linen trade, but in its place is developing a homespun tweed industry, particularly in Kerry browns. At Tralee (capital) and Kenmare are useful agricultural markets. Both deep-sea and coastal fisheries at Dingle and Valencia are increasing in economic importance. Dairy farming and Kerry cattle-breeding are the chief agricultural pursuits. In various parts are chalybeate springs. A popular holiday centre, one of the main centres being the Lakes of Killarney. Area 1813 sq. m., pop. (1926) 119,171.

Kestrel, a small falcon (*q.v.*), the commonest bird of prey in Great Britain, where some specimens spend the winter, though most come in spring from the S. It attracts attention by its habit of hovering when facing the wind, whence its name "wind-hover." It feeds very largely upon beetles and other insects, field mice, and sometimes small birds; and nests in trees or on cliffs.

Keswick, market town in Cumberland, and a tourist centre for the Lake District. It lies on the Greta, $\frac{1}{2}$ m. N.E. of Lake Derwentwater. The chief industry is the manufacture of lead pencils. The *Keswick Convention* of evangelicals is held here annually. Coleridge, Southey, and Shelley all lived at various times in the neighbourhood. Pop. (1931) 4035.

Ket (or *Kell*), Robert (d. 1549), English rebel. In 1549 he marched on Norwich at the head of 16,000 men, but was defeated, after having captured the city, by Dudley, Earl of Warwick. Ket was executed for treason. The rising, in the reign of Edward VI. was largely a protest against land enclosures.

Ketch, a small two-masted boat, fore-and-aft rigged, formerly used as a yacht and now chiefly for fishing.

Ketch, John (d. 1686), public executioner in England from 1663 to 1686. He does not seem to have been a very

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ence (1919), owing to disagreement on the financial principles of the peace, and published *Economic Consequences of the Peace*. Served on Committee on Finance and Industry (1920-30). Author of *Treatise on Money* (1930). He married in 1925 Mme Lydia Lopokova.

Key West, a town in Florida, U.S.A., situated on Florida Keys; a naval station, possessing an extensive aerodrome for land- and sea-planes. Its cigar manufacture is important, also the export of turtles and sponges, carried on largely by natives from the Bahamas, settled here. It is a popular winter resort, owing to its sub-tropical climate. Pop. (1930) 12,831.

Khabarovsk (or *Khabarovsk*), administrative centre of the Far Eastern Area of the R.S.F.S.R., situated among hills on the right bank of the Amur. It is an important focus of trade, especially in pelts, and distilling and tobacco manufacture are carried on. Pop. c. 44,000.

Khalifa [KHALE'fə], variant of the word caliph (q.v.), used chiefly in Egypt.

Khan, formerly meaning "sovereign" in Mohammedan countries, is now a title of respect only. *Cham* is a corruption of this word, as applied to the medieval rulers of Tartary and N. China.

Kharkov, capital and largest city of the Ukraine Republic, U.S.S.R.; it is important as a railway and trading centre, and is on the main line between Sevastopol and Moscow. What is probably the largest office building in Europe, the Palace of State Industry, is situated here. Here are also locomotive and car-building shops, electro-technical industries, agricultural machinery works, and one of the giants of the first Five-Year Plan—the Kharkov Tractor Works. There are 40 scientific institutions and advanced schools, 10 museums, a university, and a number of workers' clinics, courts, and clubs. Pop. (1931) 729,000.

Khartoum (or *Khartum*), a province and capital of Anglo-Egyptian Sudan, Africa, occupies the spit of land at the

confluence of the Blue and White Niles. Once a slave mart and a great trading centre for gum and Sudan ivory, it is now a winter resort, and owing to its geographical situation the bulk of Sudanese merchandise passes its way. There are many public buildings of interest, including the Governor-General's palace, with a tablet to indicate where General Gordon (q.v.) fell in 1885, the Gordon Memorial College, with the Wellcome Tropical Research Laboratory, the cathedral, Anglican and Greek churches, and the great double minaretted mosque. Pop. (town) 50,463.

Khartoum, Battle of (Sudan Campaign, Mar 12, 1884–Jan 26, 1885). General Gordon with an Egyptian garrison was besieged in Khartoum by the Mahdi, who, in face of a gallant resistance, stormed and took the place, aided by treachery from within, and massacred the defenders. Gordon himself was killed. For 4 months Gordon had been the only European in the town. Two days later (28th) a relieving force under Sir Charles Wilson arrived, but after a short engagement was obliged to return down the river. In 1898, Anglo-Egyptian forces under General (later Lord) Kitchener retook Khartoum and it again became the seat of Government.

Khedive, the title given in 1867 by the Turkish Sultan to his Egyptian viceroy. When Hussein Kamel became Sultan of Egypt in 1914, the title *Khedive* was discontinued.

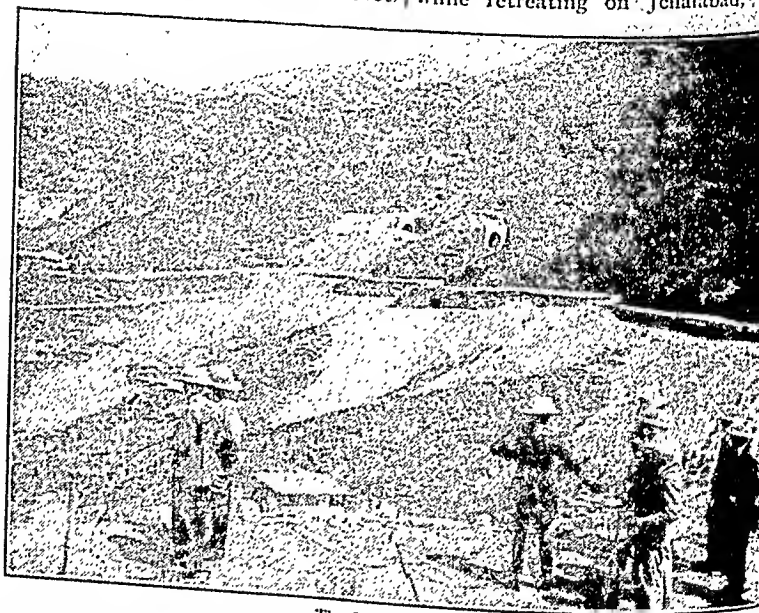
Kherson, a port, on the Dnieper, Ukraine, U.S.S.R. The industries are milling, brewing, and ironworks. Grain is the chief export; the dock is equipped with a number of floating grain elevators for dealing with the barges laden with corn. Pop. 58,809.

Khiva, town of Asiatic Russia. It forms, with Bokhara, part of the Soviet Republic of Uzbekistan. Once the centre of an ancient kingdom, today it is a trading centre for silks, cottons, and carpets. Pop. (1920) 19,880.

Khotan : (1) Oasis area of Sin-Kiang, W. China. Its fertility arises from the Kara-Kash and Yurung-Kash Rs. The irrigation problem has been vigorously dealt with and an even distribution of water by communes developed. Wheat, oats, rice, maize, and millet are produced, and in places a second crop is secured. Cotton is important, and fruit. Area, 400 sq. m.; pop. c. 200,000. (2) A town of the Khotan area, in the desert 200 m. N. of Tibet.

Meshed. Area, c. 130,000 sq. pop., including a large nomadic element. c. 1,000,000.

Khyber (Khaibar) Pass, a defile of great military importance through the mountain range separating India and Afghanistan. The pass is 30 miles long. During the first Afghan War it was the scene of many skirmishes and more than one British disaster. On Jan. 13, 1842, General Elphinstone's army, while retreating on Jellalabad,



The Khyber Pass.

Sericulture, carpet-weaving, metal-work and fancy articles made out of nephrite, a jade-like substance, are among the industries. Pop. c. 5000.

Khurasan, province of N.E. Persia, formerly called Khorasan. Although a large proportion of the area is either sterile steppe, salt marsh, or mountain, there are numerous valleys where agriculture flourishes; and the wool of the province is the best quality produced in Persia. Capital,

attacked here by the Afghans and lost over 3000 men. The road made by British troops during the 2nd Afghan War (1879-80) has now been converted into a motor road.

Kiang, the largest of the Asiatic wild asses, standing about 12 hands and chestnut in hue, with the lower half of the neck and body white. The species has never been domesticated.

Kiangsi, province, S.E. China. Mountains almost envelop it on

three sides, but the valleys are most fertile, rice being a very fruitful crop, with a margin for export. Tea and sugar are suffering from competition, and consequently tend to decline in production. Leguminous crops are doubly heavy. Area, 67,280 sq. m.; pop. c. 27,600,000.

Kiangsu, a small but important province of China, situated at the mouth of the Yang-tze-Kiang, densely populated, and in the S. region of great agricultural value. Silk and cotton are produced in modern factories with up-to-date machinery. Agriculturally Kiangsu is also highly developed, cotton and sericulture providing the material for the factories of the towns. Fruit, cereals, and peanuts are also successfully cultivated. Railways and waterways contribute to the economic importance of the province, which contains, among other important towns, Nanking and Soochow. Area, 39,100 sq. m., pop. c. 34,625,000.

Kiaochau, territory of the Shantung province, China, on Kiaochau Bay, Yellow Sea. In 1898 it was leased to Germany for 99 years, but, taken by a combined English and Japanese force in 1914, it was allotted by the League of Nations to Japan, who, in 1922, handed it back to China. Tsingtao is the chief town. Area, 193 sq. m., pop. c. 200,000.

Kidd, William (Captain) (c. 1648-1701), Scots pirate. He lived in America for a time, and received the command of the *Adventure* (1693) to suppress pirates. He turned renegade, joined those whom he was commissioned to attack, and became a noted pirate. He was taken in 1699, and hanged in London 2 years later.

Kidderminster, town in Worcestershire, England. The manufacture of carpets, first introduced in 1745, continues to this day. For a period "Kidderminster" carpets only were made here, but later a Flemish loom was set up, and Brussels carpets found a ready market. Richard Baxter (qv.) held the living 1640-41, and

Rowland Hall, of the Penny Post was born here. Pop. (1931) 28,014.

Kiel, a town and seaport S. of Kiel Bay, Prussia, Germany. It is one of the oldest towns in Holstein, with an extremely good harbour, and until 1919 the most important German dockyard. Shipbuilding is still a staple industry. There are breweries, oil and chemical works, and a few iron-foundries. There are a university, museums and an observatory. Pop. (1933) 216,430.

Kiel Canal, waterway connecting the North Sea and the Baltic. It was begun in 1857, opened in 1895, extended and deepened during 1909-14. Ownership is vested in the German Reich. The Versailles Treaty instituted certain regulations governing the use of the canal. The traffic through the canal is heavy, and under the control of the usual shipping, sanitary and customs regulations. The canal is 61 m. long, with a maximum depth of 36 ft., and at the surface is 335 ft. wide.

Kieselguhr, a siliceous earth, a very fine and light powder formed by the skeletons of minute organisms called *diatoms*. It was originally used as an absorbent for nitro-glycerine in the manufacture of dynamite, but has now found a large use for heat insulation, for which purpose it is mixed with suitable binders. See also DIATOMACEOUS EARTH.

Kiev, town on the Dnieper, in the Ukraine, formerly known as "the Jerusalem of Russia," on account of the many pilgrims it attracted. Today it is an important railway centre, with lines radiating to Odessa, Warsaw, Moscow and Kharkov. Its main industries are connected with grain, sugar-beet, timber, and cattle. Kiev is the cultural centre of the Ukraine. Its Academy of Science, with all its affiliated institutions, attracts 60,000 students. Of the many museums the Kiev-Pechersk Lavra, or Monastery, is the most notable. It was formerly a stronghold of the Eastern Church. Pop. (1931) 539,500.

Kildare, county in the province of Leinster, Irish Free State. Its industries are mainly agricultural, with brewing and distilling. It is called the "sportsman's county," having two famous hunting packs, racing at Punchestown, Naas, and the Curragh, good angling, and golf. Athy is the largest town, Naas one of the oldest Irish towns, and Maynooth the centre of training for the Irish priesthood. There are bogs in the N. and the county is well watered by the Liffey, Boyne, and Barrow. Kildare (pop. 2100) is the county town. Area, 654 sq. m.; pop. of county (1926) 58,035.

Kilimanjaro, the highest mountain on the African continent, on the N. boundary of Tanganyika Territory, about 80 m. N.W. of Mombasa. There are two chief peaks, Kimawenzi (16,870 ft.) and Kibo (19,320 ft.). The first ascent was made in 1888 by Meyer, and the mountain has since been scaled on several occasions, notably by Mrs. Latham in 1925.

Kilkenny: (1) County, Leinster, Irish Free State; its neighbouring counties are Carlow, Wexford, Waterford, and Tipperary. The production of wheat is declining. There are coal-mines and slate quarries, breweries, tanneries, and flour-mills; but no industries on a large scale. An abbey, a few round towers, and the remains of a monastery and priory constitute the relics of an ecclesiastical past. Area, 796 sq. m.; pop. (1926) 70,980.

(2) County town of co. Kilkenny, Irish Free State. A brewery, corn-mills, tanneries, and marble works are the main industries of Kilkenny. The cathedral is the one important building, and is dedicated to St. Canice. The Bishop of Ossory resides here. In 1366, one of several parliaments was held here, but on this occasion enactments were made against the Anglo-Irish, and the Brehon law was suppressed. Cromwell took Kilkenny in 1650, and 40 years later William III entered the town after the Battle of Aughrim. Pop. (1926) 10,046.

Kilkenny, Statute of, passed by Irish parliament summoned by Li Duke of Clarence, in 1377, with object of checking the degeneration of the Anglo-Irish. It strengthened English authority in Ireland and something to prevent English settlement from merging with the Irish.

Killarney, town in co. Kerry, Irish Free State. There are no industries, only a few bog-oak articles of souvenir character for visitors being made. It is a beauty spot, attracting thousands of visitors to the three adjacent Lakes of Killarney, viz., the Lower, Middle, and Upper, which together cover an area of 6110 acres and contain number of islands; on Ross island ruins of a 15th-cent. castle; and on Innisfallen those of a 6th-cent. abbey. On the modern side of the town stand the cathedral and the Bishop of Kerry's palace. Pop. (1926) 5325.

Killer Whale, see GRAMPUS.

Killiecrankie, pass, 1½ m. long, Perthshire, Scotland. It is the narrow beautiful gorge through which flows the R. Garry. Graham of Claverhouse, Viscount Dundee, having erected the standard of James II in Scotland, attacked and defeated the forces of William III at the head of the pass near Blair Athol, on July 17, 1689. The pass carries both road and railway.

Killigrew, Thomas (1612-1683), English dramatist, built the first Theatre Royal, Drury Lane (1663). He wrote many comedies and tragedies, but his reputation as a wit was greater than his fame as a playwright.

Kilmainham, suburb of Dublin, Irish Free State. It is noted for its hospital designed by Wren and its prison, where the Irish leaders Parnell and John Dillon were confined, and the leaders of the 1916 rebellion executed.

Kilmarnock, town in Ayrshire on Kilmarnock Water, c. 22 m. S.W. of Glasgow. Engineering and iron-founding are the chief industries, but boot and shoe manufacture employs a large part of the industrial population. The surrounding districts contain coal. Kilmarnock

marnock is also an agricultural centre, and holds an annual cheese fair. The town has many Burns associations. The first edition of Burns's poems was published here in 1786. Pop. (1931) 38,029.

Kilsyth, burgh in Stirlingshire, Scotland, 12 m. N.E. of Glasgow. It is a busy little town with cotton-mills within and quarries and mines without. Pop. (1931) 7650.

Kilt, a highland garment in the form of a pleated skirt reaching to the knees, worn by men, and originally the lower part of the complete plaid in which the Highlander wrapped himself. The plaid is now separated and hangs from the shoulders, while the kilt is worn with a jacket. The kilt is manufactured of tartan (q.v.) cloth, is plain in the front, where hangs a sporran or purse of leather or fur, and is pleated at the back and sides.

Kimberley, John Wodehouse, 1st Earl of (1826-1902), Under-Secretary for Foreign Affairs under Aberdeen and Palmerston (1852-6, 1859-61), and Envoy-Extraordinary to Russia (1856-8). After a brief period as Under-Secretary for India, he was made Lord Lieutenant of Ireland in 1864, and created earl in 1866. He held several ministerial offices under Gladstone. In 1893 he was Foreign Secretary under Lord Rosebery. He led the Liberal Party in the House of Lords, was Chancellor of London University in 1899, and gave his name to the town in S. Africa (q.v.).

Kimberley, a town in Cape Province, S. Africa, in Griqualand West, on a plateau between the Modder and Vaal Rs. Diamond-mining is the chief industry, the mines being situated within a few minutes' walk of the centre of the town. The principal group is the De Beers. The town is of comparatively recent growth, not being founded until 1870. Its name came from the Earl of Kimberley who, as Colonial Secretary, placed the mines under British protection. White pop. (1931) 18,618.

Kimberley, Siege of (2nd Boer War)

(Oct. 13, 1899-Feb. 15, 1900) the town with its garrison of 4000 was severely bombarded by the Boers under Commandant Wessels and, later, General Cronje. It was relieved by a force of c. 5000 cavalry under General French. The garrison lost nearly 200 men during the siege.

Kimmeridge Clay, dark clay formation, extending across England in a belt of varying width running in a N.E.-S.W. direction from Yorkshire to Dorset. It is very uniform in character, and bituminous in its upper part, where a band of oil shale, once worked commercially, occurs. It varies in thickness from 1000 ft. in Dorset to less than 100 ft. in Bedfordshire, and increases again to 500 ft. in Yorks. It is also developed on the E. coast of Scotland. See also JURASSIC.

Kincardineshire (*The Mearns*), county on the E. seaboard of Scotland. Agriculture absorbs a considerable portion of the working population, oats and barley being main crops. The moors are grouse laden, and sheep find ample pasture on the Grampians. Fishing is next in importance, both in the sea and in the Rs. Dee and Esk. Findon village gave the name to the famous smoked haddocks. Distilling, tanning, and a little flax-spinning comprise the manufactures. Stonehaven is the port, and the seat of an academy. Area, 381 sq. m.; pop. (1931) 39,860.

Kindergarten, see NURSERY SCHOOLS.

Kindersley, Sir Robert Molesworth (b. 1872). British financier. He became partner of Layard Bros. & Co., London bankers, and presided over the National Committee for War Savings from 1914 to 1918. He is a director of the Bank of England, and served on the Dawes Reparations Committee of 1924. K.B.E., 1917; G.B.E., 1920.

Kinetic Theory of Matter. In the article HEAT it is explained that the heat contained in bodies, originally supposed to be a kind of fluid, was shown by experiment to be capable of generation to an unlimited extent by mechanical means, and also to be

capable of conversion into mechanical energy. This led to the conception that it might really consist in the rapid motion of the atoms and molecules of a body. These attract one another, and in a crystalline solid such as ice they are arranged in a fixed and regular pattern, their heat consisting in their vibration at their stations, as a number of ships at anchor will roll and pitch under the action of the waves.

The effect of the mutual attraction is still seen in the formation of a surface, which behaves as if it were covered with a stretched skin, due to the unbalanced attraction. The tension of this surface layer is called the *surface tension*. We have to suppose that the molecules of the liquid are in motion with all sorts of different speeds up to a certain limit. Occasionally one of them will acquire such a speed as to shoot out through the surface of the liquid and escape from the attraction of its fellows. It thus comes about that the space above a liquid, if every other gas is removed, will be filled with vapour at a certain pressure. The molecules of the liquid which escapes into space travel on in straight lines until they collide with other similar vapour molecules. We thus picture a gas or vapour as composed of molecules flying in all directions and colliding with one another. The pressure on the walls of the vessel containing the gas is produced by the ceaseless bombardment by the molecules of the gas.

The most direct evidence that this picture is a correct one is afforded by what is called *Brownian motion*, discovered in 1827 by R. Brown, but not properly understood for long afterwards. We have said that the pressure exerted by a gas on a solid in contact with it is due to the continual bombardment of the solid by the molecules of the gas. These are so numerous that the pressure produced

continuous and uniform. But if we take a very small body, such as a particle of dust, this uniformity begins to break down. Such a particle is bombarded from all sides by air molecules, but if it is small enough, it will often happen that the total force of these blows is momentarily greater in a certain direction, and the particle will therefore move in that direction. The next instant it may be shot off in another direction. It is possible to calculate the theoretical extent of this Brownian motion, and to compare the calculated result with that actually observed, and good agreement has been found.

All chemical action is kinetic in nature. If chalk is heated, it is decomposed into lime and carbon dioxide; if lime be brought into contact with carbon dioxide, chalk is formed. Thus chemical action is dependent upon collisions between molecules, and the rate at which molecules capable of reacting collide with one another, though collision need not always be followed by reaction. This must be so, because the rate at which chemical reaction takes place increases much more rapidly, as a rule, with a rise of temperature than the calculated increase in the number of collisions. We are not yet fully clear about the actual mechanism of reaction, but it must be a matter of certain molecules attaining high energy content which enables them to react. The fundamental law of mass action is, however, a necessary result of the kinetic theory. It was formulated by Guldberg and Waage in 1887, and states that when two substances react according to the chemical equation $mA + nB = m'A' + n'B'$ (that is, m molecules of A plus n molecules of B react to form m' molecules of A' and n' molecules of B', and *vice versa*), the final condition attained is given by the equation:

$$K = \frac{(\text{Concentration of A})^m (\text{Concentration of B})^n}{(\text{Concentration of A'})^{m'} (\text{Concentration of B'})^{n'}}$$

by them appears to us to be perfectly | The reaction constant K, as it is called,

can thus be determined, and when it is known for any given mixture, the result of using other proportions can be calculated.

Kinetics, see DYNAMICS; KINETIC THEORY OF MATTER.

King, a title of vague delimitation given to chieftains and rulers of widely varying degrees of sovereignty. Etymologically the word means *son of the tribe*; and this points to the conclusion that kings were originally created by the tribe or people as a measure of practical politics. But in primitive communities leadership in practical government cannot be dissociated from leadership in religion; hence the king became also the priest. The priestly functions of a king have left material traces in the ceremonies of anointing and investing a king. It was a natural step to regard the kingship as belonging by divine right to a particular family, and thence to the establishment of the principle of hereditary succession. The complicated relationships between the Empire and the Papacy, and the quarrels between the English Stuart kings and the Parliament, were among the inevitable developments of this conception of the religious functions of kingship. The rise of democratic thought has led to the practical extinction of autocratic kingship as a form of government, and a limited monarchy, such as that of Great Britain, is that most favoured to-day by those States which have not definitely adopted republican or dictatorial forms of government.

King, William Lyon Mackenzie, (b. 1814) Canadian statesman, born at Kitchener, Ontario, became Deputy Minister of Labour in 1900, and edited the *Canadian Labour Gazette*. He studied migration and served on many Empire Immigration committees. He became Minister of Labour in 1909. During the War he studied industrial problems on behalf of many American firms. He was the Prime Minister of Canada from 1921 to 1926, with a brief interval in 1926, favouring a revision 1931 and Empire trade

agreements. He served as vice-president of the League of Nations Assembly 1924.

King-crab (or *Horseshoe Crab*), a large marine Arachnid whose nearest living ally is the scorpion (*q.v.*). The king-crab, which may measure 2 or 3 ft long, has the body ending in a long spike, while its fore-part forms a wide, somewhat horseshoe-shaped shield concealing the six pairs of appendages and the mouth, but bearing the eyes on its upper side. The food of the king-crab consists of marine worms, and it breathes by means of gills attached to the six pairs of limbs on the hinder part of the body. King-crabs are found only on the E. coast of N. America, and in the E. Indian and Chinese Seas, and are there esteemed a delicacy.

Kingfisher, one of the most gaudily



kingfisher

coloured of the British birds, being mostly metallic blue with a red breast and incomplete white collar. Comparatively small in the body, it has a large head and long bill adapted for catching fish. It may be seen on the coast, but more usually near rivers and lakes, and it lays its eggs in burrows excavated in banks. It belongs to a widely-distributed family, most of the species being considerably larger than the European kingfisher. See also *LARVAE OF JACARAS*.

Kinglake, Alexander William (1809-1821), English author, is known principally for his *Journal* as a record of his Eastern travels (1816). His

other works include a history of the *Invasion of the Crimea* (8 vols., 1863-87).

King-maker, The: Richard Neville, Earl of Warwick (1428-1471). When Henry VI was King, he defeated the Lancastrians, captured the King at Northampton, and proclaimed Edward IV King, whom he afterwards drove from the throne, restoring to it Henry VI.

King-of-Arms, see **HERALD.**

Kings, The Books of. Two narrative books of the Old Testament, divisible into three parts: (1) Solomon's reign which is dealt with fully (1 Kings i.-xi.); (2) the history of the divided kingdom to the fall of Samaria (1 Kings xii.-2 Kings xvii.), chiefly concerned with Elijah and Elisha; (3) the history of Judah from the fall of Samaria (2 Kings xviii.-xxv.), dealing mainly with the religious reformation of Josiah and with events in which Isaiah was concerned.

The Books of Kings were probably written c. 550 B.C., and it seems evident that the author was not attempting to record history, but trying to point a lesson and a moral to his readers.

It should be noted that the 2 Books of Samuel and the 2 Books of Kings in the Authorised version are known in the Vulgate version as Kings I, II, III, and IV.

King's Bench Division, see **COURT.**

King's Bounty, a grant of £3 given by the Crown to women when they give birth to 3 or more children at a time.

King's Counsel, a barrister appointed by the Lord Chancellor counsel to the Crown and called within the Bar. The position is largely honorary. A King's Counsel cannot appear against the Crown without special licence, which is always granted unless the Crown desires to be represented by the Counsel in question. See also **BARRISTER.**

King's County, see **OFFALY.**

King's Evidence, see **APPROVER.**

King's Evil, formerly a popular name for scrofula (q.v.).

Kingsley, Charles (1819-1875), English clergyman and novelist, was made

Canon of Westminster in 1873. With F. D. Maurice, he was one of the founders of the Christian Socialist movement, and his tendencies are apparent in *Yeast* (1848) and *Allan Locke* (1850). His great powers of description were displayed in *Hyppatia* (1853) and *Westward Ho!* (1855), which, with *The Water Babies* (1863), and *Hereward The Wake*, are his best-known works. His admirable versions of Greek legends in *The Heroes* (1856) are still widely read, and some of his poems (*The Three Fishers*; *The Sands of Dee*; and *When all the world is Young, lad*) still remain popular. His attack on Newman (q.v.) was the occasion of the latter's *Apologia pro Vita Sua*.

Kingsley, Henry (1830-1876), English novelist, brother of Charles Kingsley, was a traveller and a journalist. His best-known work is *Ravenshoe* (1861).

Kingsley, Mary Henrietta (1862-1900), niece of Charles Kingsley, authoress and traveller, journeyed in and studied the customs of W. Africa (1893-5). Her works include *Travels in West Africa* (1897), *The Story of West Africa*, and many essays.

King's Lynn, borough and seaport, near the Wash, Norfolk. There are fisheries, motor works, and corn- and cake-mills. The town has been a port since the Norman Conquest. Greyfriars' Tower and the Custom House are interesting buildings. Pop. (1931) 20,580.

King's Proctor, the proctor or solicitor representing the Crown in the Divorce Court. It is his duty to see that the Court is not being deceived by collusion or the suppression of material facts, e.g. where a petitioner for divorce has himself been guilty of adultery.

Kingston: (1) Capital of Jamaica, W. Indies, an excellent harbour on the S. coast. The town supplanted Port Royal as capital in 1872, but had long been the commercial centre. It was rebuilt after the earthquake of 1907. There are a number of handsome public buildings, and a 17th-cent. parish church. Pop. (1932) 120,000.

2) University town of Canada, on Lake Ontario. It is a railway centre, with shipbuilding and locomotive industries. The Queen's University was founded in 1839, and in 1875 a Military College was founded. It is the seat of Roman Catholic and Anglican bishoprics. Pop. c. 22,000.

Kingston-on-Thames, county town of Surrey, 10 m. from London. There are foundries, flour-mills, and several paper works. It appears in the Domesday Book as Chingestune, and in 838 King Egbert summoned his Witenagemot here. In the market-place there is a stone, on which it is said the Saxon Kings were crowned. During the Civil War (1647) Fairfax made it his headquarters. Pop. (1931) 39,052.

Kingston-upon-Hull, see **HULL**.

Kingston, William Henry Giles (1814-1880), English novelist, wrote many books of adventure for boys, the best known being *Peter the Whaler* (1831), *The Three Midshipmen* (1862), and its sequels, *The Three Lieutenants* (1874), *The Three Commanders* (1875), and *The Three Admirals* (1877).

Kingstown, port and summer holiday resort, co. Dublin, Irish Free State, on the S. of Dublin Bay. It has resumed among the Irish people, its ancient name, Dun Laoghaire, by which it was known before a visit from George IV in 1821. Rennie designed the harbour. There is a regular mail steamer service to Holyhead. Pop. 18,997.

Kinkajou, a member of the Raccoon family, about the size of a small cat, and found in Central and S. America. It has a prehensile tail, and lives in trees, but is a slow climber. It feeds mainly on fruits, but will eat eggs, insects, and small animals.

Kinross, the capital of Kinross-shire, Scotland, situated W. of Loch Leven. The chief manufactures are woollens, tartans, and plaid. Pop. (1931) 3323.

Kinross-shire, one of the smallest counties in Scotland, situated between Fife-shire and Perth-shire. It is mainly agricultural; oats is the chief crop.

with turnips the principal root crop. In proportion to its size, the number of cattle and sheep reared is high. There are no manufactures of importance. The only building of historic import is Kinross House, erected for the Duke of York (James II) in the event of his being debarred from the English throne. Royalty never occupied it. The capital is Kinross. Area, 82 sq m.; pop. (1931) 7454.

Kinsale, town and seaport of co. Cork, Irish Free State. Fishing is the only industry of any account. In 1590 the combined French and Spanish fleets were beaten in the harbour by the English. Pop. (1926) 2870.

Kinto, see **KYOTO**.

Kipling, Rudyard (b. 1865). British author. From 1882 to 1889 he was engaged on journalistic work in India, and in 1886 published *Departmental Duties*. This was followed rapidly by *Plain Tales from the Hills*, 1887, *Soldiers Three*; *In Black and White*, *The Story of the Godsby*, *Under the Deodars*; *The Phantom Rickshaw* (all published in 1888), and *Wee Willie Winkie*, 1889. Kipling then made a tour of China, Japan, and America, and finally came to England and incorporated his experiences in *From Sea to Sea*, 1900.

In 1891 appeared *Life's Handicap*, *The Light that Failed*, his only long novel, and *The Naulahka*, written in collaboration with Wolcott Balestier.

A volume of verse, *Currauk Room Unlids*, appeared in 1892, and was followed in 1893 by *Many Inventions*, another collection of short stories. In 1894 and 1895 appeared respectively the *Jungle Book* and the *Second Jungle Book*. In 1896 another volume of verse, *The Seven Seas*, and in 1897 *Captains Courageous*, and *Stalky and Co.* (1899). *Kim* (1901), is regarded in many quarters as his best work.

Just So Stories (1902) with many charming tales by the author himself, *Stories* (1903) is another

Kitchener was Lord Roberts's chief-of-staff, became commander-in-chief in 1900, and in workmanlike fashion brought the tedious war to a close in 1902. As commander-in-chief in India (1902-9) he gave additional proof of his great organising abilities by his re-arrangement of the British and native troops. He was made field-marshal in 1909, and was appointed commander-in-chief and High Commissioner in the Mediterranean. From 1911 to 1914 Kitchener was Consul-General in Egypt, where he was a wise administrator of internal affairs, and was chiefly responsible for preserving the peace of Egypt during the Tripoli and Balkan wars. At the outbreak of the World War Kitchener (who had



Lord Kitchener.

just been created an earl) was appointed Secretary of State for War and set about the preparation of an adequate field force. He recruited and organised a voluntary army of three million men, who were popularly known as "Kitchener's Army." His relations with his fellow members of the Cabinet were not always smooth.

Kitchener saw clearly, as many of his colleagues did not, that the war was bound to last for several years, and that the general optimistic reliance upon help from Russia was misplaced. In June 1916 Kitchener set out on a mission to Russia on H.M.S. *Hampshire*. The ship struck a mine, and practically the whole of those on board perished.

Kitchen Middens, or Shell Mounds, name given to the refuse heaps of prehistoric man. They are universal in distribution. In Britain they are found in Devon, Cornwall, and Scotland, and they are also common on the Continent, and in America, Japan, and Australia. They may be 300

yards long and 70 yards wide, while in Florida several are as much as 40 ft. high. Middens were proved to be artificial by the finding of remains of animals which never frequent the same habitat, and which were all more or less adult, and by the burnt character of some of the stones and earth. They often contain stone and wood implements. Middens are generally near the coast and are still constructed by some peoples backward in development.

Kite, medium-sized bird of prey, formerly abundant in Great Britain in the Middle Ages; the common scavenger of towns, but now almost exterminated in this country by gamekeepers. The body is reddish brown, the head grey, and the tail forked. The nest, usually made of twigs, is lodged in the fork of a tree. There are many related species found in Asia and Africa.

Kite-flying, the practice of flying light wooden frames covered with paper or thin cloth, attached to long cords, has been popular in the Far East, from very early times. In China the 9th day of the 9th month is particularly devoted to kite-flying, and persons of all ages and classes take part.

Kites were used in meteorological experiments by Benjamin Franklin in 1752. Large man-lifting kites have been used for purposes of military observation, but without any great success.

Kites, a slang stock-exchange term for paper credit not backed by commercial transactions, and especially for Accommodation Bills, or loans in the form of bills.

Kit-fox, see Fox.

Kittiwake, a medium-sized gull, distinguished by the absence of the back toe on the foot. It is entirely marine, breeding on sea-cliffs, not inland on moors or marshes like most of the British species. It occurs on both the American and European coasts of the N. Atlantic.

Kiukiang, a port, on the Yang-tze, China, connected by rail with Nanchang. The exports are green tea, beans, camphor, cotton, and paper.

Kinkiang is a collecting centre and clearing-house for tea, which is extensively cultivated in the district. Pop. (1931) 80,186

Kiwi, flightless bird, about as big as an average-sized domestic fowl, restricted to New Zealand, and usually regarded as belonging to the same group as the cassowaries and ostriches, though differing from them in many respects. There is no external trace of wings, but the legs are powerful, and the bird can run with some speed. It lives in the scrub, and lies

up by day and wanders about at night in search of its food of earth-worms, which it finds by probing the ground with its long bill. There are two or three species inhabiting



Kiwi.

the North and South Islands, but all are very similar in appearance and habits.

Kizil Irmak (anc. *Halys*), longest river in Anatolia, rising in the Kizil Dagh, and pursuing a tortuous 600-m. course S.W. to Lat. 35° E., when it bears N., then E. to the Black Sea.

Klagenfurt, capital of Carinthia, near the Yugoslav frontier, S. Austria. Its surroundings are mainly agricultural, with occasional mineral deposits. Foundries and the manufacture of white lead form its major industries. The *Landhaus*, where the Carinthian Estates held their meetings, dates from 1591. the Museum Rudolfinum contains many fine exhibits. An obelisk commemorates the Peace of Pressburg (1805). Pop. (1923) 27,423

Klaipeda (Ger. *Memel*), the port of Lithuania, on the Baltic, formerly a German town, its population is still predominantly German. It was founded in 1262, and was a prominent

member of the Hanseatic League. There is a good natural harbour, although ice-breakers are needed during the first 3 months of the year. There are some local industries, including brewing, shipbuilding, chemicals, soap, and amber, but the town is mainly an entrepôt between Poland, Russia, and the rest of Europe, the main goods handled being timber, grain, and fish. Pop. (1930) 37,400

Klaproth, Martin Heinrich (1743-1817), German chemist. Professor of Chemistry in the University of Berlin, he was an opponent of the phlogiston theory (*qv*). He discovered new elements, amongst which are uranium, titanium, and tellurium. Much of his fame rests on his numerous accurate analyses of various minerals.

Kléber, Jean-Baptiste (1753-1800), French general. Born at Strasbourg, he entered the Austrian Army. He returned to France in 1783, and took a distinguished part in the opening stages of the French Revolutionary Wars, in the Netherlands. He went as Napoleon's second-in-command to Egypt, later taking command and winning a brilliant victory at Heliopolis. He was murdered by a mameluke in Cairo.

Kleist, Heinrich Wilhelm von (1777-1811), German author, published his first tragedy, *Die Familie Schroffenstein*, in 1803. Many other tragedies, influenced by the romantic *Sturm und Drang* movement, followed; also several comedies. *Prinz von Homburg* (published 1821) was his greatest tragedy, and *Der zerbrochene Krug* (1811) his best comedy.

Klinger, Max (1857-1920), German artist. Klinger's drawings, when he exhibited at the age of 21, caused considerable sensation in Berlin, their violent eccentricity leading even to accusations of insanity; and this was only the first of a series of outbursts produced by his work from time to time. Examples of his highly imaginative and rather morbid paintings and drawings are contained in most of the public galleries of Germany, and

include *Pieta* and *Christ in Olympus*. He also produced a number of pieces of sculpture and his *Salome* and *Cassandra* are in the Leipzig Museum.

Klipspringer, a small antelope found in rocky hills all over Africa S. of the Sahara, but not in the Congo Forest. It is distinguished by its coarse, pithy hair, and by its habit of walking on the extreme tips of the hoofs, which are truncated to give foothold on the smallest ledges of a precipice.

Klondike, a district, in the Yukon area, N.W. Canada. The discovery of gold in the rivers in 1896 led to an enormous influx of treasure-hunters, and until 1910 a large amount of gold was produced. As the output fell, the population dispersed, until Dawson, once a thriving town, dwindled to a village. The present gold output is very small.

Klopstock, Friedrich Gottlieb (1724-1803), German poet, author of the great religious epic, *Der Messias* (1748-73), which he planned at school, under the influence of Milton. His writings also include several dramas and some beautiful odes.

Kluck, Alexander H. R. von (1846-1933), Prussian General, born at Munster, Westphalia. He fought in the Austro-Prussian War (1866) and the Franco-Prussian War (1870); becoming Inspector-General of the Eighth Army in 1914. In the World War he led the Army of the West in the advance on Paris and the Marne, but was forced to withdraw to the Aisne (1914). He was wounded in the front trenches in March 1915, and retired 18 months later.

Knee, a hinge-joint, formed by the femur, tibia, and patella (see **SKELETON**). Its movements are more complex than the ordinary hinge motion, the condyles of the femur partly rolling, partly sliding over the flat surfaces on the upper end of the tibia, being accompanied by a certain amount of rotation. The bones of the joint are bound together by very strong ligaments, so that it is seldom

to tubercular disease. Displacement of a cartilage commonly results from a sprain of the knee. It is attended by sudden severe pain, and the knee becomes partly locked in a bent position, but may suddenly become free again. The limb should be kept at rest until inflammation has subsided and then immobilised in plaster of Paris. An operation may be necessary. A foreign body in the joint produces similar symptoms. Tuberculosis of the knee usually comes on gradually, the knee becoming white, smooth, and swollen. Fluid collects, forming an abscess, and the joint may become completely deformed. The condition may be cured by resting the limb in the early stages and building up the general health.

Kneller, Sir Godfrey (1648-1723), portrait painter, was born in Lübeck and studied in Holland and Italy. He came to England at the age of 26, and after the death of Lely, became the foremost portraitist in the country. He was Court painter to Charles II, to William III, who knighted him, and to George I, who gave him a baronetcy. Examples of his work can be seen at Hampton Court and in the National Portrait Gallery. His style was to some extent modelled on that of Van Dyck, and was similar though inferior to that of Lely.

Knight, Dame Laura (née Johnson), English painter, trained at Nottingham School of Art and at the Royal College of Art in S. Kensington. She first exhibited at the Royal Academy in 1903, and her paintings of circus life, of landscapes with figures, and portraits are well known and widely admired for their liveliness and freshness of colour and treatment. She became an A.R.A. in 1927 and D.B.E. in 1929; examples of her work hang in many English and colonial public galleries. Her husband, *Harold Knight*, is also a well-known painter, and became an A.R.A. in 1928.

Knighthood. The word "knight," as may be seen from its Latin and French equivalents *comes* and *chevalier*,

was originally associated with a mounted soldier; and, since only the more well-to-do could afford to maintain a horse for purposes of war, the term naturally acquired the connotation of some degree of nobility. Knighthood from early times carried with it the blessing of the Church, and an obligation to live up to certain ethical standards which can best be described as those by which a "gentleman" governs his life; and, with the Crusades, the religious aspect of knighthood received a very definite impetus. From the time of the Crusades, too, various orders of knighthood began to be distinguished, e.g. Knights Banneret and Knights Bachelors, Knights Templars, Knights Hospitallers, and the Teutonic Knights of the Cross (see separate headings for the last three of these).

With the decay of feudalism, knighthood gradually lost both its military and its religious associations, and today the title of "knight" is one conferred by the sovereign as a reward for some signal public or political service (see **TITLES AND COURTESY TITLES**). There still exist various orders of knighthood, many of which have the traditions of centuries behind them. The British orders of knighthood include those of the Garter, the Thistle, St. Patrick, the Bath, the Star of India, St. Michael and St. George, the British Empire, and the Indian Empire. Among the famous continental orders are those of the Holy Ghost (France, abolished 1830); the Golden Fleece (Spain and Austria); the Elephant (Denmark), St. Hubert (Bavaria); the Annunziata (Italy); the Seraphim (Sweden), and the French Legion of Honour.

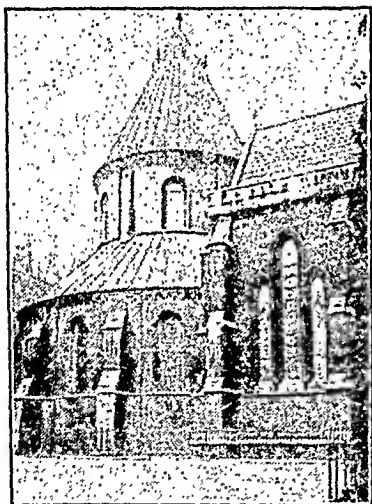
Knights Hospitallers (or *Knights of St. John of Jerusalem*), originally one of the three great military orders of crusading times, others being the Knights Templars and the Teutonic Knights of the Cross (qqv). The Order was founded in the 11th cent to protect Christian pilgrims visiting the Holy Sepulchre. The Order became semi-religious, supervising the church of

its own in Jerusalem, and semi-military, taking an important part in the defence of Acre. The knights took the island of Rhodes in the 14th cent and held it till 1523, when, upon its capture by the Turks, the Order was forced to move to Malta, where it governed until Napoleon's occupation (1798). Accordingly the Order was frequently named the Knights of Rhodes and Malta. They gained great wealth and power, taking over many of the forts and possessions of the *Knights Templars* (qv), on their suppression in 1312. They dedicated themselves to the service of the sick, vowed poverty, chastity, and obedience, and were distinguished by a black cloak with a white Maltese cross on the breast. In 1879 the headquarters were settled in Rome. The English Order of the Knights of St. John was reorganised on a purely charitable basis in 1827, and now manages a street ambulance service and a charitable distribution to convalescents. Its headquarters are in Clerkenwell, London. See also **ST. JOHN AMBULANCE ASSOCIATION**.

Knights of Malta and of Rhodes, see KNIGHTS HOSPITALLERS

Knights Templars, most famous of mediæval military Orders, which also included the Knights Hospitallers and the Teutonic Knights of the Cross (qqv); founded in 1118-19 by 9 French knights fighting in the Holy Land. As Poor Soldiers of the Holy City, they vowed to maintain free passage for pilgrims. Baldwin II of Jerusalem gave them part of his palace as headquarters, while the church and convent of the Temple gave them a further building and their later name. Pope Honorius II placed the knights under the rule of St. Benedict in the middle of the 12th cent, and made their distinguishing mark a white mantle, to which a red cross was later added. The Order rapidly gained wealth, fame, and high esteem. It was nominally ruled by the Chapter of Knights. Considerable possessions came into its hands. In 1187 the Grand Master lost Jerusalem and settled in Acre,

moving to Limisso. The Order distinguished itself in successive crusades. In 1307, at the instigation of Philip le Bel of France, the Grand Master was summoned to Europe, allegations of heresy were brought against the Templars, those in France were arrested, the Grand Master executed, and in a few years the Order had completely died out. In Portugal those of its



Temple Church, London, jointly owned by the Middle and Inner Temple, was built by the Knights Templars. It is a fine specimen of early Gothic architecture and dates from the 12th-13th cents.

members remaining became the Order of Christ.

Knin, a fortified town, on the rail from Split (Spalato), Yugoslavia, 20 m. N.E. of Sibenik. It is in a fertile agricultural region. Pop. c. 23,000.

Knitting, making chains of loops, or stitches, generally with two needles. There are only two stitches in knitting, plain and purl—all other patterns are made by variations, and by *increasing* (knitting into the back as well as the front of the same stitch, or by putting the wool over the needles) and *de-*

creasing (knitting two stitches together, or by knitting two stitches and bringing the first over the second, and in casting off).

Some of the most simple patterns are the garter stitch, plain knitting stocking stitch, 1 row plain, 1 row purl; basket stitch, 4 stitches plain, 4 purl for 4 rows, then 4 purl, 4 plain for 4 rows. This last can be knitted with a larger number of stitches than 4, knitting the same number of rows as there are stitches in the rib. Most stitch consists of 2 rows, the first plain, 1 purl, and the second 1 purl, plain. When knitting on 4 needles, or on a circular needle, plain knitting has the same effect as stocking stitch done on 2 needles.

Machine knitting, though much younger than the cognate art of weaving, nevertheless dates back to 1589, when the first knitting machine was invented. Knitting itself is not known with certainty to have existed at an earlier date than the 5th cent. A.D., actual loop fabrics of that date having been discovered. Hand knitting was not introduced into England until the 15th cent. Knitting and crocheting are the two methods of forming loop fabrics by hand, and probably the latter, which is simpler in principle than the former, preceded it. The corresponding terms used in machine work are *framework*, or *weft knitting*, and *warp knitting*.

In *weft knitting* the fabric is made up of rows of loops which join by interlacing.

The Reverend William Lee was apparently the first person to construct a knitting machine. His machine was successful, and contained many constructional elements still in use to-day, including the *bearded needle*; but he was given no opportunity to employ it.

The development of the knitting machine was continued in England throughout the 19th cent.

There are three fundamental types of loop formation, corresponding to the *bearded needle*, the *latch needle*, and

the *bi-partite needle*. The latch-needle type of machine is the most largely used. In every type of machine there must be a needle for every loop, in which respect machine knitting differs from hand knitting. Although power was applied to knitting machines at quite an early date, and successfully from c. 1850, hand-driven machines are still largely used for many purposes, especially where the highest class of work is required. The simplest type of machine is the hand *circular knitting machine*, which normally produces tubular work, but can also turn out flat, selvedged fabric. Another type of machine worked by turning a handle is the *flat knitting machine*, also working with latch needles, and exceedingly adaptable, since it can produce a large range of fabrics of any desired width.

The Jacquard mechanism for controlling knitting machines is applied, in the same way as in weaving, to enable any desired pattern to be obtained by a selection of particular needles.

The machinery used in the manufacture of knitted goods works at very high speeds, and like modern automatic looms requires no skilled attendance, a single girl being able to attend to 6 or 8 machines. Such a machine making hose may make 80,000 stitches a minute, turning out a complete stocking in a few minutes.

CONSULT: John Chamberlain and James Henry Quilter, *Knitted Fabrics* (London, 1924).

Knoblock, Edward (b. 1874), dramatist, born in New York. His works include *Milestones* (1912) and *London Life* (1924) in collaboration with Arnold Bennett; *The Good Companions* (1931), with J. B. Priestley; *Evensong* (1932), with Beverley Nichols; the dramatisation of Vicki Baum's *Grand Hotel* (1931), and A. J. Cronin's *Hatter's Castle* (1932); and original plays, of which *Kismet* (1911), *My Lady's Dress* (1914), and *Mumsey* (1920) are the best known.

Knocking, see ANTI-KNOCK AGENTS.

Knollys, (1) Sir Francis (c. 1514-1590), English statesman, M.P. in

1542, and served in the army against Scotland 1547. He fled the country on the accession of Mary, owing to his Protestantism. Under Queen Elizabeth he held office as a Privy Councillor and Vice-Chamberlain of the Royal Household. He was sent on several important missions, and was given the charge of Mary, Queen of Scots, during her imprisonment. (2) FRANCIS, 1st Viscount (1837-1924), Gentleman-usher to Queen Victoria; Groom-in-waiting to King Edward VII when Prince of Wales; Private Secretary to King Edward (1870-1910), and to King George V (1910-13); Lord-in-waiting to Queen Alexandra, Baron, 1902; Viscount, 1911.

Knorr, Ludwig (1859-1921), German chemist, studied at various German universities, and after holding various teaching positions finally received the post of Professor at the University of Jena, which he held till his death. Knorr's work was almost entirely in organic chemistry. In addition to the isolation and synthesis of a large number of compounds, including antipyrine (*q.v.*), he did a considerable amount of research on the problem of tautomerism (*q.v.*). He also carried out investigations on the morphine alkaloids.

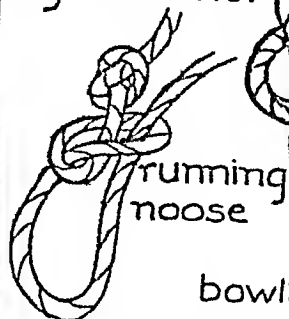
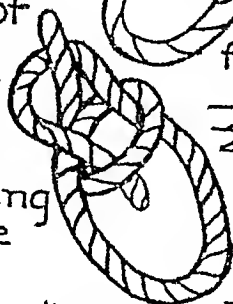
Knot. A knot in a cord or rope may be made either in the end of the rope, between two ropes, or on a loop in the middle; in all cases such a shape is given that, either owing to friction, or to geometrical necessity, tension can be put on the rope in one or more directions without slipping occurring. The sailor applies the term *bend* to the knotting together of two rope ends, and *lash* to attaching a rope to a spar or other solid object. Nevertheless, the most familiar knot, the *reef knot*, is the means used for tying together two reef points on a sail in taking in a reef. This is the most suitable knot for the purpose, since it cannot slip, and yet does not jam, but can be readily undone by pulling one of the free ends backwards.

Ropes are spliced together by two

KNOTS



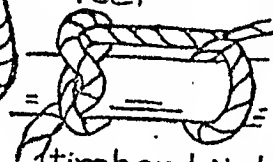
figure 8 knot

tom
fool knotrunning
noose

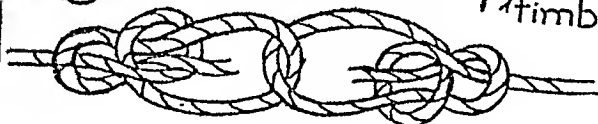
bowline



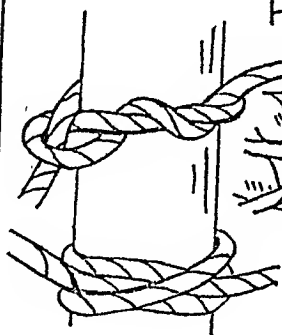
reef



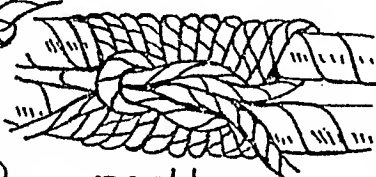
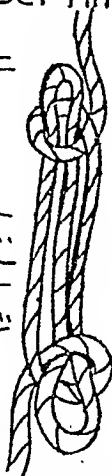
timber hitch



half hitch



clove hitch

necklace
tie

dog shank

types of *splice*, the *long splice* and the *short splice*. Both types require the rope to be untwisted over a certain distance, the two ends being put together with the strands alternating with one another. The short splice is formed by plaiting the ends in and out of the untwisted parts of the two ropes for two or three turns, then cutting away half the thickness of the ends and continuing the plaiting for a few more turns. In the long splice a strand of one rope is laid into the other rope, one strand of the latter being untwisted for that purpose. When this has been continued for a distance several times the thickness of the rope, the two strands are knotted together with a single knot, and the ends plaited in. The same process is then carried out with one strand of the second rope, and the result is a joint which is practically no thicker than the original knot.

Knot, one of the plover family, rather larger than a snipe, but with shorter legs and bill, and the back mottled black and white. It breeds in the Arctic, and is a winter visitor to our shores.

Knot-grass: (1) A small rare plant found in boggy ground in the W. of England, representing a family of plants from S. Europe and N. Africa, with slender tangled stems of reddish colour and sessile leaves and whorls of white flowers. (2) A weed of waste ground and roadsides, wholly unrelated to the former, with long prostrate or erect stem bearing narrow elliptical leaves and minute flesh-coloured or greenish flowers. (3) Cultivated plant related to (2), of very varied appearance, usually known as *Polygonum*.

Knout, a whip formerly used in Russia for flogging criminals. A common form consisted of a wooden handle to which a 16-in. lash of raw hide was attached, ending in a metal ring to which other lashes were tied, each ending in a ring and a hook.

Knowles, James Sheridan (1784-1862), English dramatist, was the

author of many plays, popular in his own day. They include *William Tell* (1825), *The Hunchback* (1832), and *The Love Chase* (1837).

Knox, Edmund George Valpy (b. 1891), English humorist; became Editor of *Punch* in 1932. His works include *Parodies Regained*, *It Occurs to Me*, *Here's Misery*, *Slight Imitations*, and many other collections of humorous articles and poems. He is the son of the Rt. Rev. Bishop E. A. Knox, D.D., and a brother of Father Ronald Knox.

Knox, John (c. 1505-1572), Scottish religious reformer. He was taken prisoner by the French in 1547 and sentenced to work in the galleys on the Loire. Released after 2 years, he became a licensed preacher at Berwick, but upon the accession of Mary Tudor he fled abroad, and came under Calvin's influence at Geneva. When he returned to Scotland in 1555 he was granted permission to preach throughout the S. of Scotland for a few months. The enthusiasm with which he was received ensured the final triumph of Protestantism in Scotland. Mary of Lorraine, however (who was acting as Regent for Mary Queen of Scots), prohibited the reformed preaching in the country. In 1560, Knox was appointed minister at Edinburgh, and it was in this year that he and other Protestants made their confession of faith. With the return of Mary Stuart to Scotland in the following year, Knox's cause received a set-back, but was nevertheless accelerated through the Queen's ill-fortune and Darnley's murder. When the Queen escaped to Dunbar, Knox retired to St. Andrews.

His most famous works are *The First Blast of the Trumpet Against the Monstrous Regiment of Women* (1558) and his *History of the Reformation in Scotland* (1584). His collected works were issued (6 vols.) in 1848-8.

Knox, Rev. Ronald A. (b. 1888), English author and Roman Catholic priest, was a brilliant scholar at Eton and Oxford. His works include detec-

tive stories, *The Viaduct Murder* (1925), and *The Footsteps at the Lock* (1928); sermons on the Catholic faith; and *Essays in Satire* (1928), and *Caliban in Grub Street* (1930).

Knoxville, a town in Tennessee, U.S.A., on the Tennessee R. The manufactures are mainly textiles, iron-founding and making of household and office furniture. Near by are coal, iron, zinc, and copper mines, and marble quarries. There is a State University, founded in 1794. Pop. (1930) 105,802.

Knucklebones, a very old game probably of Asiatic origin, and popular in ancient Greece and Rome. Five small pieces of bone or metal are tossed into the air and caught on the back of the hand in a variety of ways. It is known by various local names, e.g. "Fivestones" and "Dabstones."

Knutsford, Sydney George Holland, 2nd Viscount (1855-1931), chairman of the London Hospital for over 30 years. He raised more than £0 millions for its upkeep and improvement—thereby earning the sobriquet "The Prince of Beggars"—and changed it from a badly run, second-rate institution to one of the best-equipped hospitals in the world, with a well-known medical school attached. He joined it in 1895 after 5 years of reforming the Poplar Hospital, produced a "bombshell report" on its condition, and began a work in its service which ended only with his death.

Koala, an Australian marsupial (q.v.), known from its likeness to a small bear as the "Native Bear." It is rather larger than a cat, but more



Koala.

clumsily built, and has large hairy ears, a very thick coat, and no visible tail. It crawls slowly about the eucalyptus gum-trees, upon the buds and foliage of which it almost exclusively feeds.

Only one young one is born at a time, and this, after staying a few months in its mother's pouch, climbs on to her shoulders to be carried.

Kob, medium-sized African antelope (q.v.) ranging from Senegambia to Kenya, and related to the waterbucks, but smaller, being c. 3 ft. at the shoulder.

Kobe, a seaport town on the Bay of Osaka, Honshu, Japan. Ship-building is the principal industry. The main interest of the town authorities is being directed to land reclamation and an extension of the port, owing to the fact that the Yokohama earthquake of 1923 deflected most of its trade and commerce to Kobe, which has excellent rail connections and a fine harbour. Pop. (1930) 787,016.

Koblentz, see COBLENZ.

Koch, Robert (1843-1910), German scientific bacteriologist. Koch commenced work with a microscope and a few kitchen utensils, but he isolated bacteria, grew pure cultures of them, and made microphotographs.



Dr. Koch.

His greatest triumph is the isolation of the tubercle bacillus (the germ of consumption) and his invention of the tuberculin test, by which herds of cattle are now tested.

Kock, Charles Paul de (1794-1871), French novelist, was the author of *Georgelle* (1820), *André le Sauvoyard* (1825), and other novels of Parisian life.

Kodak, see CAMERA.

Kodak, new name for Fasiloda (q.v.).

Koh-i-noor, famous diamond, weighing 106 carats, now set in the State crown of Queen Mary (see CROWN JEWELS). It originally weighed 186 carats. In 1730 it came into the

possession of Nadir Shah, and in 1849 was presented to Queen Victoria by the East India Company.

Kohistan, a general term for mountainous regions in Persia, different parts of Afghanistan, and the region between Sind and Baluchistan.

Kokand, a town in Uzbekistan, U.S.S.R., Asia; a trading depôt for Turkestan. Flour-milling and cotton-cleaning are among the foremost industries. Silk and raw cotton are exported, the town and district being dependent upon European Russia for its manufactured articles. It is a walled town with well-laid-out suburbs, a strange mixture of the ancient and the modern. Pop. c. 70,000

Kola, a peninsula between the Arctic Ocean and the White Sea, N. Soviet Russia. On its N. shore, called Murmansk, valuable fishing stations for seal, herring, and salmon are located. The climate renders agriculture practically impossible, a few potatoes and turnips being grown in a restricted area. Game is plentiful and varied, and native tribes breed the reindeer. Investigation has revealed unsuspected iron deposits. Pearls are found in the rivers Kola and Tuloma. The population are mainly Lapps. For administrative purposes it is part of the Leningrad area. Murmansk is the chief town. Area, 60,000 sq. m.; pop. c. 27,000.

Kola Nut, the nut of an African tree now cultivated in the W. Indies and Brazil. The nut is about the size of a chestnut, and contains caffeine; it makes a stimulating drink.

Kolbe, Adolphe Wilhelm Hermann (1818-1884), German chemist, who, in 1842 became assistant to Bunsen, a post he retained for 5 years. He then spent some time in London and in Brunswick, and in 1865 was appointed professor at Leipzig, where he remained until his death.

Kolbe's scientific activities may be divided into three fields, those of teacher, scientific writer, and chemical research worker. In the last sphere his work was principally concerned with

organic chemistry. His theories met with considerable success, and he predicted the existence of the unknown secondary and tertiary alcohols in 1859.

Kolchak, Alexander Vasilievich (1875-1920), Russian admiral, entered the Navy at the age of 13, fought in the Russo-Japanese War (1904-5), and was in charge of a warship in the Baltic in 1914. He was given command of the Black Sea Fleet in 1916, with the rank of rear-admiral. After the Revolution he fought against the Bolsheviks in Siberia, and was declared Supreme Ruler of Russia by the Omsk Government in 1918. A brief success was followed by the collapse of his resistance to the Soviets in 1919, and his Government retreated for a while to Irkutsk, where he finally handed over his powers to Denikin (Jan. 1920). He was shot by the Bolsheviks a month later.

Kolhapur: (1) The largest native State controlled by the Bombay Presidency, partly on the W. of the Deccan and partly among the W. Ghats. Timber, sugar-cane, and millat are the chief products. Kolhapur is a feudalised State ruled by a dynasty of Rajas descended from the early rulers of the Marhatta confederacy. Area, 2800 sq. m.; pop. c. 920,000. (2) Capital of (1); there are textile, paper, and pottery manufactures. Pop. c. 56,000

Kollontay, Alexandra Mikhailovna, the first woman to become ambassador of a great Power. She was a staunch follower of the pre-War Menshevik movement in Russia, but joined Trotsky in 1914, working abroad. At the revolution of 1917 she returned to Leningrad, where she entered the Bolshevik ranks, and did a great deal of public speaking. She became first People's Commissar for Social Welfare in the new Government. In 1922 she was sent to Norway as Russian political and trade representative, and in 1927 she went to Mexico as full Ambassador. After a few months' work she returned to Russia,

and was later sent in the same capacity to Denmark.

Kolozsvár, see CLUJ.

Koltsov, Alexei V. (1809-1842), Russian poet, of humble birth, was the author of many charming poems in peasant language, dealing with Russian peasant life. They appeared first in 1835. His health was delicate, and he died early of consumption.

Komárno (Hung. *Komárom*), river port at the confluence of the Váh and the Danube, in Czechoslovakia. The soil is rich and the cereal crop important. Its industries are the building of small river craft, wine, fruit, and a little timber. During the Hungarian Revolt (1848-9) it successfully held out against the Austrians, owing to the genius of General Klapka. By the Treaty of Trianon it was handed over to Czechoslovakia. Pop. 21,140, of whom all save 4000 are Hungarians.

Komintern, the Communist or Third International, Association of the Communist parties of all countries, founded in 1919 by Lenin, with its headquarters in Moscow, as a rival to the Second International. See also COMMUNISM.

Komura, Marquess Jutaro (1855-1911), Japanese statesman, born in Hiuga and educated at Harvard, U.S.A. He entered the Japanese foreign office in 1884, and was successively chargé d'affaires at Peking, and minister in Washington, St. Petersburg, and Peking. From 1901 and through the Russian War he was Foreign Minister, being Japanese delegate at the Portsmouth Conference (1905). He negotiated an alliance with England, and received a K.C.B. from Edward VII. He was Ambassador in London from 1906 to 1908, and Foreign Minister again from 1908 until 1911.

Kondyles, George (b. 1880), Greek statesman and general; entered the Army, and in 1905 fought as an irregular against Bulgaria. He served in the Balkan and World Wars, retiring as a colonel in 1920. In 1923 he suppressed a revolt and entered Parliament

as a republican. He formed a National Republican Party, and joined the Government as Minister of the Interior. He was banished by General Pangalos in 1925, but, returning, overthrew the latter and became Prime Minister, promising to retire from politics after holding a fair election. This he did, but assumed opposition activity shortly afterwards. He was Minister for War under Tsaldaris in 1932.

Konia (or *Koniéh*): (1) Vilayet of Asia Minor. There are two industries, carpet-making, and cotton and silk goods; agriculture is practised by the majority of the population. Wheat, oats, and rye, with cotton and poppy seeds for opium, are the main exports. Area, 18,900 sq. m.; pop. (1927) 504,384.

(2) Town and capital of the vilayet. Its ancient name was Iconium. It was occupied by Barbarossa and was a centre of art and literature until annexed by the Turks c. 1475. It is on the rail road to Istanbul and Bagdad. Pop. (1927) 47,495. See also ICONIUM.

König, Karl Rudolph (1832-1901), German physicist and inventor of acoustic instruments, including tuning-forks and wave-sirens.

Königgrätz, see HRADEC KRÁLOVÉ.

Königgrätz [KĚ'NIGRÄTZ], Battle of (July 3, 1866): the decisive battle of the Seven Weeks' War; the Prussians (221,000) under William I and the Crown Prince succeeded in piercing the Austrian lines and driving them from their position with a loss of 20,000 killed and wounded and 20,000 prisoners. Also called the Battle of Sadowa.

Königsberg, port and capital of E. Prussia, Germany, on the Pregel. It is fortified and important commercially and industrially. Among its industries are shipbuilding, railway rolling-stock, brewing, pianos, and amber goods. The sea-canal (20 m.) connecting the town with Pillau, the Baltic port, provides a good outlet for its produce. Königsberg is an air-traffic centre. There are a university, castle, and Gothic cathedral. Kant was born here. Pop. 311,520.

Königssee, lake in Upper Bavaria, S. of Salzburg. 1855 ft. above sea-level. Its length is 5 m., and its greatest width just over a mile. Trout are caught in its green waters. The limestone crags that surround the lake invest it with a beauty and grandeur, making it an outstanding feature of the German Alps.

Koran, the sacred book of the Mohammedans. The word means "reading" or "recitation," and is more correctly written Kur'an or Qur'an. The work contains the revelations which are alleged to have come to Mohammed through the Angel Gabriel, and are given in one hundred and fourteen *suras*, or chapters. These *suras* bear distinctive headings, the place of their origin and the number of verses. Islam considers the Koran to contain all knowledge, and "he who reads it with the desire of receiving a reward from God, and with patience, will receive in Paradise a Hourī as wife." God's revelations to Mohammed were not recorded in a book during the prophet's lifetime; they were noted down on any material that happened to be at hand, such as palm-leaves, staves, leather, etc. It was the Khalif Abu Bakr (A.D. 632-634) who ordered the collection of the various fragments into one book, destroying variant versions. The doctrines of the Koran are that there is one God, "the Merciful, the compassionate," one true religion, and that the greatest of God's prophets were Moses, Christ, and Mohammed.

The best-known English translations are those of Sale, Rodwell, and Marmaduke Pickthall.

See *The Koran, its composition and teaching*, by Sir W. Muir, and *The Holy Qur'an, with English translation and commentary* (1917), by Muhammad 'Ali.

Kordofan, province of Anglo-Egyptian Sudan. Millet is cultivated in certain regions; the chief sources of revenue, however, are gum extracted from the acacia, camel breeding, and

ostrich plumes. During the latter half of the 18th cent the territory was in the possession of Mehemet Ali, and in 1899 came under the control of the Sudan Government. Capital, El Obeid. Area (approx.), 130,000 sq. m.; pop. 671,000.

Korea (*Chosŏn*), a peninsula of Asia, S. of Manchuria, forming part of the Japanese Empire since 1910. Area, 85,228 sq. m.; pop. (1932) 21,038,000. Capital, Keijo-fu (Seoul). In spite of its distinctly mountainous character Korea is definitely an agricultural country, half of its area being under cultivation. Rice-growing takes up one-third of the acreage tilled, the remainder being sown with barley, wheat, cotton, beans, and tobacco. Coastal fisheries, particularly the whale fishery, are steadily developing. Special attention has for some time been paid to fruit-growing and stock-raising.

The minerals are gold (of which some is worked by foreign corporations), copper, iron, and coal. Towards the N. of the peninsula anthracite is found. Interior communication is indifferent, the roads uneven, and the railway system (1585 m.) imperfect but improving. A large amount of produce-carrying is restricted to oxen and pack-horses in the hilly areas. The rivers as a rule are only navigable a few miles from the coast, except the Yalo (Amnok), Naktong, and the Han, the latter being of commercial value for quite 150 m. The open ports are 14 in number, including Chemulpo and Fusan. There is a university at Seoul, and for Japanese education 467 elementary schools, and for Koreans 1170 ordinary schools, with medical, law, technical, and industrial schools, and 25 high schools for girls.

The language spoken by the people is a combination of Mongol-Tartar and Japanese, with Chinese words added, though most official correspondence is conducted in Japanese. The Koreans form the bulk of the population. Since 1919 Korea has been

treated as an integral part of Japan, and is split up into provinces for administrative purposes. Conditions and treatment since 1919 have left the Koreans with little individual freedom of speech, press, or movement. Harsh rule has strengthened the movement for independence.

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Kremlin, The, the nucleus around which Moscow has grown, first walled in the 12th cent. The present wall, 1½ miles long and 65 ft. high, was constructed by Italian architects at the end of the 15th cent., and has 16 towers. Within the walls are palaces, churches, cathedrals, and an arsenal. Some of the palaces have been turned into museums, while other buildings

contain the offices of the Central Government of the U.S.S.R.

Before St. Petersburg (Leningrad) was made the capital, the Tsar and his nobles lived in the Kremlin; during the 18th and 19th cents., it was allowed to fall into disrepair, but now that Moscow is once more the capital, restoration work has been carried out, and the Kremlin stands as a monument of all the changing styles of Russian architecture.

Lenin's mausoleum stands just outside the Kremlin walls, in the Red Square, and beneath the walls are the graves of Communists killed in the 1917 Revolution.

Kreutzer, Rodolphe (1766-1831), French violinist of German extraction, is immortalised as the man to whom Beethoven dedicated the "Kreutzer" Sonata. Besides many operas and orchestral works, he composed a series of excellent studies for the violin.

Kreuzer, a small copper coin formerly used in Austria-Hungary, so-called from the cross (*kreuz*) stamped thereon, and dating back to the 13th cent. 100 kreuzer made 1 gulden. The coin was also used in S. Germany, where 60 constituted 1 gulden.

Kriemhild [KRE'MHILT], in Teutonic mythology, the heroine of the *Nibelungenlied*, the sister of the Nibelungs and the wife of Siegfried, whose death she avenges by slaying Gunther, Hagen, and Brunhild (*q.v.*). She afterwards married Etzel (Attila the Hun).

Kris, see DAGGER.

Krishna, in Hindu mythology, one of the greatest gods and heroes, an incarnation of Vishnu, is told of in the *Bhagavad-Gita*. Krishna was also the name of a legendary aboriginal king and of the compiler of the *Vedas*.

Krishnamurti (b. 1891), theosophical teacher, born at Madranapalle, Madras. In 1909 Mrs. Annie Besant persuaded Krishnamurti's father to allow him and his brother to be educated for spiritual leadership. He was quickly accepted by the Theosophists, a number of whom formed "The Order of the Star of the East." One of

the main points of his philosophy is a belief that spiritual development is necessarily an individual matter, and he therefore opposes organised religion as leading to spiritual exclusiveness. In accordance with this doctrine he dissolved his own "Order of the Star of the East" in 1929. See also BESANT, MRS. ANNIE.

Kristiania, see OSLO.

Kromeskie, a meat mixture bound together with a thick sauce or panada. A slice of bacon or pork caul is rolled around this mixture, and the whole dipped in batter, and fried.

Krøne, a coin and monetary unit in Denmark, Norway, and Sweden, 18-159 of which are equivalent to £1 sterling at par.

Kronstadt, naval port and dockyard of Soviet Russia, situated on a small island at the end of the Gulf of Finland, within easy distance of Leningrad. Its strategic value was recognised by Peter the Great, who fortified it in 1703. It has achieved fame for the revolutionary activities of the sailors stationed there, and from 1826 to 1921 mutinies have been frequent and sometimes important. For c. 22 weeks annually the port is icebound. Pop. c. 31,200.

Kropotkin, Peter Alexeievich, Prince (1842-1921), Russian geographer, revolutionary and writer. He entered the Russian Imperial Corps of Pages in 1857, but was greatly influenced by revolutionary thought. He joined the Army in 1862, was aide-de-camp to the Governor of Transbaikalia, and attaché for Cossack affairs in E. Siberia. He led two geographical expeditions through Manchuria in the same year. In 1871 he returned to revolutionary work. Becoming more extreme, he preached nihilism and anarchism in Russia, was arrested, escaped to London, and began writing and publishing revolutionary literature in France and Switzerland. He was arrested in France in 1883 and sentenced to 6 years' imprisonment, but was released in 1886 and returned to England, where he lived until the Russian Revolution.

when he returned to Moscow without taking any part in politics.

Kruger, Stephaanus Johannes Paulus (1825-1904), president of the Boer republic of the Transvaal. At the age of 10 he migrated N. with the "Great Trek" of Boers from Cape Colony. He took part in expeditions against the natives. In 1864 he became Commandant of the Transvaal forces. He was leader of the opposition in the seventies that resulted in bringing the Government to a standstill and in the annexation by the British. In 1883, after the Boer rebellion, he was elected president. Kruger died in Europe in 1904. See also **BOER WAR**; **TRANSVAAL**.

Kruggersdorp, a town of the Transvaal province, S. Africa. It is a mining centre, 20 m. from Johannesburg, and the chief town on the W. Rand. It was named after President Kruger, and owes its existence as a town to the discovery of gold and manganese. White pop. (1931) 14,500. See also **JAMESON RAID**, **THE**.

Krupp, Alfred (1812-1887), founder of the great steel and armament firm of that name in Essen. Succeeding to a small metal-foundry owned by his father, he early adopted the Bessemer process, and turned his attention to the production of railway parts and equipment. In 1847 he began the manufacture of cannon, and by 1857 had advanced sufficiently to produce breech-loading guns of 100 tons. The firm had now become of international importance in the production of armaments, as well as armour-plating. Before his death he had already begun the acquisition of iron-mines and collieries with a view to making the firm self-sufficient.

Krupskaya, Nadezhda Konstantinovna, wife of Lenin (*q.v.*), whom she met in 1894, after which they worked in the closest co-operation. In 1898, following the 1st Congress of the Social-Democratic Labour Party, she was exiled and joined Lenin in Siberia, where she wrote her first book, *The Working Woman*. From 1901 to 1905

she lived in Germany and England, returning to Russia in the latter year, but living in exile after the 1905 revolution until the overthrow of Tsardom in 1917. During 1915-16 she wrote *Popular Education and Democracy*. Since 1917 she has occupied a responsible position in the Soviet Education Department.

Krylenko, Nikolai (b. 1885), Russian revolutionary general and lawyer. He agitated against the existing régime while still a student, helped to lead the revolutionary "Comrades of Abraham" in 1905, and took part in the first and second Duma elections. In 1906 he wrote *The Research of Orthodoxy*. Arrested in 1913, he escaped, but returned, to be arrested again in 1915, before being sent to the front as sub-lieutenant. At the revolution he was made President of the 11th Army Committee, and went as delegate to the first Congress of Soviets. He issued the "fraternizing order," and became generalissimo of the Red Forces. At the cessation of hostilities he became public prosecutor and was made Commissioner of Justice in 1931.

Krylov, Ivan Andreievich (1768-1844), Russian author. His early works include tragedies, satires, and a comedy, *The Pie* (1802). He is famous for his *Fables* (1809), satirical in tone; many are translations of La Fontaine.

Krypton, a gaseous element which belongs to the rare gases (*q.v.*) that form group 0 of the periodic table. It is employed to a small extent for filling electrical luminescent tubes. See also **ELEMENTS**.

Kuban· (1) Province of the Caucasian Area (U.S.S.R.) (*q.v.*), producing petroleum, coal, cattle, horses, wheat, tobacco, and fruit. Area, c. 39,000 sq. m.; pop. c. 2,600,000.

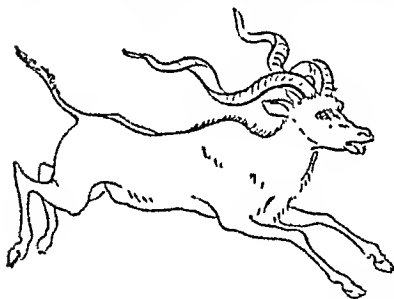
(2) River rising from the snows of Mount Elbrus in the Caucasus, and flowing to the Black Sea, which it enters through a delta in the vicinity of the Kerch Strait. The river is frozen over in winter, and is navigable

for some 70 m. upstream from the mouth. Length, c. 450 m.

Kubelik, Jan (b. 1880), Czech violinist, who in his youth created a world sensation by his precocious brilliance. Kubelik, a pupil of Sevcik, reached the pinnacle of his fame in the early years of this century, but is still occasionally to be heard in this country.

Kublai Khan (or *Kubla Khan*) (c. 1216-1294), first Mongol Emperor of China and grandson of Jenghis Khan. He reigned from 1259, completed the conquest of China in 1279, and founded the Yuen dynasty, which continued till 1368. The splendour of his Court inspired Coleridge's poem, *Kubla Khan*.

Kudu (or *Koodoo*), one of the largest and handsomest of the African antelopes (q.v.), standing c. 5 ft. at the shoulder and distinguished by its dark-grey colour relieved by narrow white stripes, and by the horns, present only in the male, being long and spirally twisted, like a corkscrew.



Kudu.

It is found in open or hilly country in E. and S. Africa.

Kuen-Lun (or *Kwen-Lun*), one of the loftiest mountain ranges in Asia, stretching from the Tibetan plateau on the W. to near Honan City in the E., covering in all nearly 2510 m. across S. China. Some peaks reach 25,000 ft.

Ku-Klux-Klan, secret society formed in the South U.S.A., after the conclusion of the American Civil War,

1865, to terrorise the negroes emancipated from slavery and enfranchised as a result of the war, the southern whites fearing they would be outvoted by the negroes. This society used a white cloak and white hood as a uniform, to play on the negroes' superstitions; and had a fantastic hierarchy, ranging from the Grand Wizard at the top to Ghouls at the bottom. By 1870, repressive measures had to be taken by the Federal Government, as the Klan was controlling elections by force.

In 1915, this organisation was revived, but with a slightly different programme, which included opposition to Roman Catholicism and Jews as well as negroes. It, however, declined rapidly in 1928 after an initial advance. See also LYNCH LAW; VIGILANTES.

Kulja (Chinese *Il-ho*), province of Sinkiang, China. It is situated on the N.W. Frontier of China with the Russian republic of Kazakstan on its W., and watered by the R. Ili. It is mountainous, some of the peaks being over 17,000 ft. high. The valleys are mainly used for cotton and fruit cultivation. Climatic conditions near Kulja town admit of barley crops at an altitude of over 6000 ft. Its mineral wealth has declined of late, although gold, silver, copper, and coal are found within easy reach of the capital. Manufactures are mainly for home consumption. Kulja (Pop. c. 11,000) is the chief city.

Kulm, town in Poland (formerly Prussia) on the Vistula, where on Aug. 29-30, 1813, the allied Austrians and Russians with a small force of Prussians utterly routed the French (40,000). The Allies lost 5000, the French 6000 killed and 10,000 captured.

Kumaon (or *Kumaun*), a division of the United Provinces, British India. A large part of it is covered by the S. Himalayas and dense forests. Agriculture is limited, but in the lower valleys, and where forest clearings have taken place, rice and wheat are cultivated. Fruit is also grown. Minerals are iron, copper, and lead. After the Gurkha war of 1815 Kumaon was

annexed by Britain. In 1891 the division was split into 3 parts, and later two of these were united until the present administrative division was formed with Naini Tal as capital. Area, 13,743 sq. m.; pop. c. 1,400,100.

Kumasi (or *Coomassie*), capital of Ashanti, Gold Coast, W. Africa. The town is modern, and divided into native, business, and residential quarters. Kumasi has a Wesleyan college, a fort, a club for resident Europeans, and an adequate system of drainage and electric light. Apart from its railway, there are a number of useful motor roads, including the trunk road from Kumasi to Pame. Ashanti was annexed by Great Britain in 1801. Pop. (1931) 30,254.

Kummel, see *Liqueurs*.

Kumquat, a citrus fruit (i.e. belonging to the same family as the lemon and orange) growing in China, but now cultivated in Japan, Florida, California, and in English greenhouses. The fruit is used chiefly for preserves.

Kun, Béla (b. 1885), Hungarian politician and journalist. He led the Communist revolution in Hungary in 1919, and became Chairman of the Council of People's Commissars during the short Soviet administration. He escaped to Austria on the outbreak of the White counter-revolution, and was interned, but was freed at the intervention of the Russian Government. He fought against Wrangel, was again arrested in Austria (1923), and upon being freed, went to Moscow. He is a member of the Council of the Komintern (q.v.).

Kuprin, Alexander Ivanovich (b. 1870), Russian author, known for his novels, *The Duel* (1903), *Sasha* (English translation, 1920), and *The River of Life* (English translation, 1916). His style shows some contrast with the typical Russian novel, and his stories deal with active, rather than passive, men.

Kurdistan, the country of the Kurds, a mountainous region of W. Asia, from the R. Aras to the Iraq plains, and from the Euphrates to Persia and

extending into Turkey, Iraq and Persia. Sheep are extensively raised on the vast tableland. It is watered by the Tigris and Euphrates. Cereals and fruit are cultivated. In Sinandaj, seat of government, carpets are woven. Area, c. 52,000 sq. m.; pop. c. 1,500,000.

Kurland, see *Courland*.

Kuropatkin, Alexei Nikolaievich, General (1848-1923), Russian general, entered the Army at the age of 16. In 1882, after much activity in Central Asia, he was made major-general, and in 1903 took command of the Russian Army in Manchuria, directing operations in the Japanese War (1904-5). In the World War he fought at first in the West, but in 1916 was made Governor-General of Turkestan. At the time of the Revolution he was teaching in a village school.

Kursk; (1) Province in the U.S.S.R. bounded N. by Orel, S. by Kharkov, E. and W. by Voronezh and Cherugov. The province has two agricultural divisions, the N. producing cereals, maize, flax, and potatoes, and the S. fruit, sugar-beet, and flowerseeds. The larger industries are sugar-refining, distilling, iron-smelting, chalk, flour, and tobacco. There are a number of peasant industries, from toys to carpets. It is a backward province in education and communications. Area, 17,975 sq. m.; pop. c. 2,700,000.

(2) Capital of Kursk province. There is considerable industrial and commercial activity in Kursk. The manufactures are soap, candles, small-arms and ammunition, bricks, tobacco, and hardware. Kursk is an important railhead for the dissemination of grain. Pop. c. 100,000.

Kuruman, small town in British Bechuanaland, which has developed from a missionary station founded in 1818.

Kut al Imara (or *Kut el Amara*), a town in a loop of the lower Tigris, almost an island. During the World War it was captured from the Turks, and defended by General Townshend against a five-months' siege to April 1916, when the British forces sur-

rendered. The town was reoccupied by Sir Stanley Maude during his advance on Bagdad (1917). The chief manufacture is of carpets. Pop. c. 6000. See also MESOPOTAMIA, OPERATIONS IN.

Kutusov, Mikhail Larionovich (1745-1813), prince of Smolensk and Russian general. After campaigns in Poland against Turkey he was given political posts. He commanded the Russian troops at Austerlitz (*q.v.*), and again during Napoleon's invasion of Russia, when he harassed the French retreat and destroyed the greater part of the Grand Army.

Kuwait (*Koweit*), port in the N.W. of the Persian Gulf, some 80 m. S. of Basra. It has a fine harbour, and is the natural eastern port of Central Arabia. The principal exports are horses, cattle, and wool. Kuwait is the centre of a small independent Arab state of the same name under British political influence. Pop. c. 50,000.

Kvass (or *Kwass*), a Russian drink, dating from the 16th cent., made by the fermentation of the grains of wheat, barley, and rye. It is slightly alcoholic, containing from 1 to 2 per cent. of alcohol (beer and stout, 3-7 per cent.). Sugar and fruit are sometimes added.

Kwangsi, province in S. China. Its valley agriculture is distinctly subtropical. Rice, the main Chinese food, is grown in quantities to provide a surplus for the neighbouring province of Kwangtung. Sugar, cinnamon, tobacco, and hemp are exported in limited quantities. The province is rich in tropical woods producing oil and camphor. River and road communication is extending. The capital is Nanning. Area, 80,950 sq. m.; pop. (estimated) 12,258,000.

Kwangtung, province in the extreme S. of China. Rice is largely cultivated, a double crop being obtained annually. Fruits, particularly oranges, are grown in the Canton delta, bananas in the Tung Valley, and sugar. Silk-worm growing is important. The climatic advantages allow of the possibility of 4 or 5 mulberry crops a year. Fatshan

is the clearing-house for timber. There is a small fishing industry. The capital is Canton. Area, 99,970 sq. m.; pop. of province was officially estimated at 36,733,502 in 1926.

Kwantung, the S. portion of the Liaotung peninsula (area, 1438 sq. m.), leased by China to Russia in 1898, and since the war of 1905 occupied by Japan. Cap., Dairen. Pop., 905,200.

Kyash, Lydia (b. 1886), Russian dancer; came to England, 1908, and was *première danseuse* at the Empire Theatre, performing frequently in London theatres. In 1923 produced ballet for the Carl Rosa Opera Company, and subsequently organised ballets, retiring from active dancing in 1925. Among her greatest successes have been *The Water Nymph* and *First Love*. She published *My Romantic Recollections* in 1920.

Kyd, Thomas (1558-1594), English dramatist, was the author of the famous *Spanish Tragedy* (1584), a play that enjoyed the greatest success of any pre-Shakespearean drama. It is a melodrama of the Senecan type, and full of horror and bloodshed. A pre-Shakespearean play about Hamlet was possibly written by Kyd.

Kyles of Bute, narrow, curved channel of the Firth of Clyde, separating the island of Bute from the Argyllshire mainland.

Kyoto, former capital of Japan, on the island of Honshu. This "city of peace" manufactures a number of typical Japanese wares, bronzes, fans, porcelain, and embroidery. Kyoto is famous for its beautiful old shrines and temples. In 1869 it was superseded by Tokyo as capital. Pop. (1930) 765,142.

Kyrie [*KE'RII*], contraction of *Kyrie Eleison* ("Lord, have mercy"), a petition used in the Eastern and Roman Catholic Churches; also, in its translated form, in the Anglican Church during the morning and evening services, in the Communion Service, the Litany, and after the recitation of each of the Ten Commandments.

Labarum

Labarum, an adaptation of the Roman cavalry standard to Christian symbolism by Constantine and his successors. It consisted of a gilded spear and a cross-bar hung with a jewelled purple cloth and surmounted with a golden wreath encircling the sacred monogram χ . It was first introduced c. 312.

Labé, Louise Charlin Perrin (c. 1516-1566), French poetess, "*la belle Cordière*," is said to have fought in the French Army. Her love for Olivier de Magny, a poet, may have inspired her love lyrics, which are among the best in the French language. They are sincere and frank in their passionate expression.

Labiate Family, a large and well-marked family of plants, comprising some 2500 species of herba and shrubs, which all agree in having square stems, opposite leaves, labiate or two-lipped flowers, and a four-lobed ovary, with



Floreal Diagram of the Labiate Family.

a single style arising from the base of the lobes. They are abundant in temperate climates. Many are fragrant, and aromatic. *Patchouli* is a favourite perfume, both in its natural state, and when distilled. *Lavender* (q.v.) contains a fragrant volatile oil, which is valued both for its perfume and as a medicine for its stimulant properties. Several kinds of mint, as

L

peppermint, and pennyroyal, are much used in medicine. Spearmint, basil, thyme, marjoram, savory, and sage are commonly used as pot herbs.

Labiche, Eugène Marin (1815-1884), French playwright, was the author of many excellent farces, including *Le Pape de M. Perrichon* (1840) and *Le Chapeau de paille d'Italie* (1851), which was made into one of the first and best of René Clair's films. Some of his plays were translated into English.

Lablache, Luigi (1791-1858) the most famous bass singer of his time, was born at Naples, making his début when he was 18. His superb voice with its great range made him celebrated in every European capital. He retired in 1852 and died six years later.

Labord, Fernand (1860-1917), French advocate, famous for his defence of Colonel Dreyfus at his court-martial, 1893 and 1899, and that of Emile Zola, who was prosecuted for libel arising out of this case. Labord also defended in the Humbert affair (1902) and in the murder trial of Mme Caillaux, 1914. Founder of the *Grande Revue*.

Labouchere, Henry du Pré (1831-1912), English Radical M.P. and journalist; held diplomatic positions in several European capitals and in Washington, before becoming, in 1863, a member of Parliament. In 1877 he founded *Truth*, of which he was editor and proprietor. He represented Northampton with Charles Bradlaugh for some years, and was a famous Radical free-lance. His criticism of royal grants led Queen Victoria to declare that he must never be a Cabinet Minister. He inherited a fortune, and was known as a wit.

Labour. The word labour is nor-

Labour

mally used to connote any manual service rendered in the production of wealth, and therefore, in economics, is a name for the total body of workers. The comparison of labour of different kinds is extremely difficult, bearing in mind the varying degrees of physical and mental skill required, of hours worked and remuneration received. Broadly speaking, however, two main tendencies in the treatment of labour stand out in modern times. For the past hundred years the remuneration of labour has tended steadily to rise, and the hours of labour steadily to fall.

Primitive labour required little specialisation, each individual being responsible for the many kinds of production—food, clothing, and shelter—necessary for his own welfare, and for his contribution to tribal wealth.

In the Middle Ages a very great division of labour was evolved, all except the lowest classes being organised by trades into "guilds," which maintained certain standards and enrolled young workers as "apprentices." A tradition of paternalism made the master of his trade responsible for the teaching and well-being of the apprentices in his workshops.

The coming of the Industrial Revolution (*q.v.*) completely disorganised the mediæval system of labour and introduced entirely new conditions. The new factory industries, springing up in remote valleys where water-power was available, recruited child-labour from the workhouses. Living in or close to the factory, the workers were completely under the control of the employer, and were frequently worked from thirteen to fifteen hours a day. The new machinery required mainly unskilled labour, so that there was no longer any incentive to teach workers a trade, or to keep them after the age at which they would demand higher wages. A steady flow from the country to the towns soon provided a more than adequate labour-supply,

and enabled employers to keep down wages. Any attempt at common action on the part of the workers, to obtain better wages or improved conditions, was liable to punishment by transportation under the Combination Act.

The remainder of the 19th cent. was spent in a struggle by the workers for an increased share in the benefits and profits of industry. In this the Trades Unions (permitted after 1824, but not fully legalised until 1871) played an important part, giving articulate representation for the first time to the great body of labour. Standards rapidly improved, and an increasing power came into the hands of the Trade Unions.

With the turn of the century and more scientific study of production and psychology, a new attitude developed. It was recognised that shorter hours often meant increased efficiency and not infrequently greater output, that higher wages gave an increased purchasing power to the workers and therefore also stimulated demand and general prosperity. The philosophy of high wages, developed chiefly in the highly standardised industries of the United States, is perhaps the greatest change in the employers' attitude towards labour since the Industrial Revolution. This conception of the profits of industry as infinitely expanding, the workers' and the employers' well-being being mutually dependent, is in direct opposition to the old idea of a fixed volume of wealth over the division of which employers and employed were doomed to struggle endlessly. All tendencies, however, point to the realisation of the unity of interest of capital and labour.

See also **CONDITIONS OF WORK; COST OF LIVING; HOURS OF WORK; STRIKES AND LOCK-OUTS; TRADE UNIONS; WAGES, etc.**

Labour Colony, a farm for the compulsory or voluntary employment of vagrants and poor people on the land. Systems of labour colonies exist in

Needlepoint, or point lace, made with needle, and pillow lace, made with bobbins and pins on a pillow or cushion. *Needlepoint Lace.* The pattern is drawn on a piece of parchment, which is stitched on to two pieces of linen. The outlines of the pattern are stitched through both parchment and linen. The lace-work then proceeds along the lines of the pattern, various ties being introduced to hold the pattern in place.

Pillow Lace. The parchment pattern is pricked with holes, and fastened to a pillow. Pins are stuck in the holes to guide the threads. The bobbins, with their threads, are stretched to the top of the pillow and run across the pattern. The threads are then plaited and worked into the design.

The earliest lace appears to have been made in the 16th cent., pillow lace slightly antedating needlepoint lace. The earliest needlepoint lace (*punto in aria*) was made at Venice. It was followed in the 17th cent. by bobbin or raised point lace (*gras point de Venise*). The art flourished simultaneously in the Low Countries. The chief centres were Brussels, Mechlin (Malines), and various towns in Flanders. Henry III of France (1574-1610) introduced the art into France from Venice, and Louis XIV (1643-1715) encouraged its development. The most important centre was Alençon, the *point d'Alençon* becoming famous. In England pillow-lace was made in the Home Counties during the 17th cent, and in the 18th cent. at Honiton, Devonshire. The best-known Irish centres were Limerick and Carrickmacross.

See, Illustration, Vnl. 5, facing p. 169.

Lace-bark, a W. Indian shrub related to the Thymo family. It has interlacing bast fibres, resembling lace, but of no commercial value.

Lacedæmon [*LASADÉMON*] (or *Lacônia*), ancient name for the district of the Peloponnesus belonging to the city-State of Sparta.

Lacewing-flies, insects belonging to the order Neuroptera, and forming a special group, including also the ant lions (*q.v.*). They are characterised by the elaborate interlacing pattern of the wing-veins. The larvae are active and feed largely on green-fly and other pests, their jaws being specially adapted for piercing the tissues and sucking the juices of their prey.

Laches, in English law, negligence in pursuing a legal remedy whereby the party forfeits the remedy. See also *LIMITATION OF ACTIONS*.

Lachmann, Karl Conrad Friedrich Wilhelm (1793-1851), German philologist, produced editions of Propertius (1616), Catullus (1820), Lucretius (1850), and many other Latin writers, but is best known for his *Betrachtungen über Homers Ilias* (1837), a critical study of the *Iliad* which affirmed that it was a collection of lays rather than one complete poem.

Lac Insect, one of the scale-insects of the order Hemiptera (*q.v.*), a native of India, valuable for its secretion of the substance which yields lac-dye and shellac. It is related to the cochineal insect (*q.v.*).

Lackey Moth, an insect whose caterpillars are voracious feeders on the leaves of the apple, cherry, plum, pear, oak, hawthorn, willow, alder, elm, and rose. They are gregarious, living and feeding together most of their lives. In colour they are blue-grey with white and orange stripes, have red-brown hairs, and spin silk nests, which are often large and conspicuous. Early in July, each spins a cocoon, from which a brown moth emerges three weeks later. After pairing, the female lays her eggs in a ring of one or two hundred, completely encircling a twig. The eggs hatch in April.

La Cloche, James De (1643?-1669), an adventurer of Jersey, who claimed to be a natural son of Charles II. He appeared in Rome and Naples, according to Lord Acton (1862), bearing documents purporting to be letters from Charles II. These, on internal

was transferred to Newfoundland. The remainder of the peninsula is included in the province of Quebec.

The population includes some 1500 Eskimos, 4000 Indians, and 9000 whites. The area is c. 512,000 sq. m.

Labradorite, a kind of felspar (*q.v.*), occurring as a massive constituent of basic rocks, such as gabbros and basalts and often used for the inside walls of buildings, on account of its iridescence.

Labrador Tea is made from the leaves of any species of the genus *Ledum*, which are Canadian shrubs. The drink is made in the same manner as tea.

La Bruyère, Jean de (1645-1696), French essayist, was tutor to the grandson of Condé. His famous work is his *Caractères*, after the style of Theophrastus, whose work he also translated. They are satirical and moral descriptions of types observed in Paris, some being based on real people. The prose style and the wit of these essays are excellent.

Labuan, island in the Malay Archipelago, off the coast of Brunei, annexed to the Straits Settlements in 1906. Capital, Victoria. A cable connects Labuan with Singapore, Hong Kong, and Landakan. Area, 28 sq. m.; pop. 7600.

Laburnum (*Laburnum vulgare* or *Cytisus laburnum*), is a small tree of the order Leguminosæ (*q.v.*), native to France, Switzerland, N. Italy, S. Germany, and elsewhere. It is cultivated as an ornamental tree in Britain, N. America, and other places. There are, however, several varieties in cultivation, *Cytisus Adami* being remarkable in having three kinds of flowers, yellow, purple, and brick-red, the latter blossoms being hybrid between the other two kinds and sterile.

Labyrinth [LA'NIRINTIS], name for a building or confined structure from which escape is difficult owing to the windings and intricacies of its passages. In ancient Greek mythology, a labyrinth, in which the Minotaur was

imprisoned, was built by Dædalus (*q.v.*) at the command of Minos, King of Crete. Mazes, with their hedges or borders, are imitations of labyrinths; the best known in modern times being the Maze at Hampton Court (*q.v.*).

Lac, a gum-like crust formed on the young shoots of trees by the lac insect (*q.v.*), *Coctus lacca*, a native of the E. Indies. This crust takes the form of a cocoon, the insects living in small cavities within. Red fluid in the ovary of the fertilised female constitutes commercial lac dye, which is extracted from the resin with hot sodium carbonate. The resin also furnishes shellac, and for this purpose is crushed, washed in hot water, melted, strained, and dried. It is used in varnish, sealing-wax, and cements. See LARCH.

Laccadive Islands, a group of 14 coral reefs and islands in the Indian Ocean, off the W. coast of Madras. Only 9 of the islands are inhabited. They are flat, the soil is sandy, and grain, fruit, vegetables, and coconuts are grown. Boat-building is carried on by the natives. The islands were discovered in 1498 by Vasco da Gama, and are now attached to the Madras Presidency. Pop. (1931) 16,000.

Laccolith, an intrusive mass of igneous rock at no great depth in the earth's crust, and having roughly the shape of a bun, with a flat under-surface, but arching up the overlying strata.

Lace, in its original sense, means a string or cord which binds or holds together, such as a boot-lace, stay-lace, etc. The term was later applied to twisted or plaited threads used decoratively as trimmings and as hair or hat ornaments. In its most extended sense lace is a fine net-like fabric wrought with designs of linen, silk, or cotton thread; in some cases gold or silver thread is introduced as well. Gold lace, as used on uniforms, is an ornamental trimming of gold wire, plaited or worked into designs.

Handmade lace is of two kinds—

Needlepoint, or point lace, made with needle, and pillow lace, made with bobbins and pins on a pillow or cushion. **Needlepoint Lace.** The pattern is first drawn on a piece of parchment, which is stitched on to two pieces of linen. The outlines of the pattern are stitched through both parchment and linen. The lace-work then proceeds along the lines of the pattern, various ties being introduced to hold the pattern in place.

Pillow Lace. The parchment pattern is pricked with holes, and fastened to a pillow. Pins are stuck in the holes to guide the threads. The bobbins, with their threads, are fastened to the top of the pillow and all across the pattern. The threads are then plaited and worked into the design.

The earliest lace appears to have been made in the 16th cent., pillow lace slightly antedating needlepoint lace. The earliest needlepoint lace (*punto in aria*) was made at Venice and was followed in the 17th cent. by open or raised point lace (*gras point de Venise*). The art flourished simultaneously in the Low Countries. The chief centres were Brussels, Mechlin (Malines), and various towns in Flanders. Henry III of France (1574-1589) introduced the art into France from Venice, and Louis XIV (1643-1715) encouraged its development. The most important centre was Alençon, the *point d'Alençon* becoming famous. In England pillow-lace was made in the Home Counties during the 17th cent., and in the 18th cent. at Honiton, Devonshire. The best-known Irish centres were Limerick and Carrickmacross.

See Illustration, Vol. 3, facing p. 169.

Lace-bark, a W. Indian shrub related to the Thyme family. It has interlacing bast fibres, resembling lace, but of no commercial value.

Lacedæmon [*LASED'EMON*] (or *Laconia*), ancient name for the district of the Peloponnesus belonging to the city-State of Sparta.

Lacewing-flies, insects belonging to the order Neuroptera, and forming a special group, including also the ant lions (*q.v.*). They are characterised by the elaborate interlacing pattern of the wing-veins. The larvae are active and feed largely on green-fly and other pests, their jaws being specially adapted for piercing the tissues and sucking the juices of their prey.

Laches, in English law, negligence in pursuing a legal remedy whereby the party forfeits the remedy. See also **LIMITATION OF ACTIONS.**

Lachmann, Karl Conrad Friedrich Wilhelm (1793-1851), German philologist, produced editions of Propertius (1816), Catullus (1820), Lucretius (1850), and many other Latin writers, but is best known for his *Betrachtungen über Homers Ilias* (1837), a critical study of the *Iliad* which affirmed that it was a collection of lays rather than one complete poem.

Lac Insect, one of the scale-insects of the order Hemiptera (*q.v.*), a native of India, valuable for its secretion of the substance which yields lac-dye and shellac. It is related to the cochineal insect (*q.v.*).

Lackey Moth, an insect whose caterpillars are voracious feeders on the leaves of the apple, cherry, plum, pear, oak, hawthorn, willow, alder, elm, and rose. They are gregarious, living and feeding together most of their lives. In colour they are blue-grey with white end orange stripes, have red-brown hairs, and spin silk nests, which are often large and conspicuous. Early in July, each spins a cocoon, from which a brown moth emerges three weeks later. After pairing, the female lays her eggs in a ring of one or two hundred, completely encircling a twig. The eggs hatch in April.

La Cloche, James De (1643?-1669), an adventurer of Jersey, who claimed to be a natural son of Charles II. He appeared in Rome and Naples, according to Lord Acton (1862), bearing documents purporting to be letters from Charles II. These, on internal

evidence, have been proved to be burglars. He is one of the many who have been identified as the Man in the Iron Mask (220).

Lacoste, Jean René (b. 1906), French lawn tennis player. During a comparatively short career he achieved all the tennis honors, being singles champion at Wimbledon in 1925 and 1928, American champion 1926 and 1928, and French champion 1925, 1927, and 1929. He married Miss Thion de la Chaux, the French golfing champion, in 1930. Suffered from indolent health. He was non-playing captain of the French Davis Cup Team 1933, of which he had been a prominent member from 1924 to 1929.

Lacquer, the process of applying varnish made of resin to wood and metal. In Japan the art has been at a very high level for centuries. The inside walls of temples and houses, and all kinds of domestic articles, and even suits of armor, have been subjected to this process at different periods. On a very carefully prepared wooden surface the chosen decoration is drawn, and then the whole is covered with a transparent lacquer, highly polished. A further development, which grew out of the demand in the West for painted exterior work, is the addition of gold, under the lacquer, and also decorations in high relief in mother-of-pearl and metal.

Lacroix, Paul (1800-1884), French author, wrote many romances and historical works under the name of "Jacques Atholphe." His best-known histories are *The Middle Ages* (1847), *History of France*, *History of France and Political* (1850-1851).

Lacrosse, a game of American-Indian origin, first adopted by white settlers in Canada, and has come to be regarded as the Canadian national game. Lacrosse is played on a ground 100-150 yds. long and of any width; the goal is 6 ft. by 4 ft. and a 15-ft. square (15 ft. by 15 ft.) is marked out round each goal, which no opponent may enter here.

A ball of indiarubber sponge, 8 to 8½ in. in diameter, and 4½ to 4½ oz. in weight, has to be thrown through the opponents' goal by means of a netted stick, called the *crosse*. The *crosse* is made of hickory, one end being bent over and fastened with a leather thong to the shaft 2 ft. from the other end and the intervening space filled with a network of gut or leather. The *crosse* may be of any length, but not more than 12 in. in breadth. The game is played between 2 teams of 12 a side. The duty of each player is to "mark" one of the opposing side all through

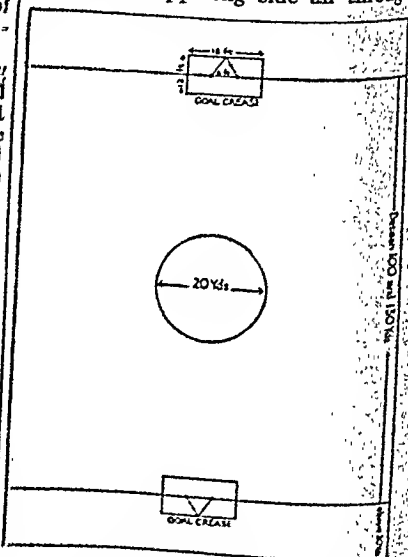


Diagram of Lacrosse Ground.

At the start of a game the "faced," i.e. placed on the "2" centres," who with their ends on side of the ball to pick the ball thrown

not to

200 yds. with a crosse, but running with the ball and short passing are generally more advantageous than long throwing. "Charging" is forbidden. There is no "offside" rule.

The *National Lacrosse Association of Canada* was formed in 1887, and the *English Lacrosse Association* in the following year. A North-South match has been held annually since 1877, and a county championship held since 1905. The first match between Oxford and Cambridge was played in 1903; up to 1933 Oxford won 17 matches, and Cambridge 7, with one draw.

Lactarius, see MOUNT LACTARIUS

Lactic Acid, $\text{CH}_3\text{CH}(\text{OH})\text{COOH}$, a colourless liquid which solidifies at 18°C . It can exist in either the racemic or the *d* or *l* forms. The ordinary lactic acid obtained by the bacterial fermentation of milk, starch, etc., is the racemic form, and is employed in the leather and textile industries and also in the manufacture of non-alcoholic beverages. The *d*-acid, or sarcosolactic acid, is found in muscle, and is of considerable physiological importance in connection with the "tiredness" due to accumulation of the lactic acid. The *l*-acid can be obtained by the bacterial fermentation of sucrose (see STEREO-CHEMISTRY).

Ethylene lactic acid ($\text{CH}_2\text{OH}\cdot\text{CH}_2\text{COOH}$) can be obtained by synthetic methods, but has no industrial use.

Lactose (*milk sugar*), a disaccharose (see CARBOHYDRATES) which is found in milks. It is obtained industrially by concentration in vacuum pans of the whey obtained as a by-product in the manufacture of cheese. It is employed in the manufacture of infant foods and, being a strong reducing agent, in the silvering of mirrors. It is less sweet than cane sugar.

Ladakh [LAD'AK], region forming, with Baltistan (q.v.), a province of the Kashmir State, N.W. India, on the S.W. of the Tibetan plateau about the upper Indus valley, between the Himalayas and the Kuen Lun Mountains. It is one of the highest inhabited

regions in the world (average elevation, over 11,000 ft.) and extremely barren, save where irrigation makes cultivation possible in the oases. The average rainfall is less than 3 in. per annum. The inhabitants are of Mongolian stock; they profess Buddhism, and are remarkable for their practice of polyandry. The capital is at Leh, on the caravan route from Srinagar to Tibet. Ladakh was annexed to Kashmir (1834-41). Pop. c. 35,000.

CONSULT. E. F. Knight, *Where Three Empires Meet*. W. Lawtence, *The Valley of Kashmir*.

Ladder Dredger, see DREDGER.

Ladenburg, Albert (1842-1911), German chemist. He was a pupil of Kekulé (q.v.), and held the Chairs of Chemistry at the Universities of Kiel and of Breslau. Ladenburg has the credit of accomplishing the first synthesis of a naturally occurring alkaloid, this being the synthesis of cocaine (q.v.), which was commenced in 1886, and completed in 1899.

Lading, Bill of, note signed by the master of a ship acknowledging the receipt of merchandise for carriage; it is the evidence of the title to the goods shipped, and by its endorsement, and delivery the property in the goods shipped is transferred.

Ladislaus I (Saint) (c. 1040-1095), King of Hungary from 1077, in whose reign Christianity became the national religion of Hungary and much land in the S. and E. was added to the kingdom. He was greatly loved by his subjects for his wise and just rule, and there are many legends attached to him.

Ladislaus IV (1262-1200), King of Hungary (1279), a Rumanian. He introduced semi-pagan practices into his kingdom. This, and his political leanings towards Naples, caused a number of civil wars throughout his reign. He was finally assassinated by the Rumanians, whom he had been forced by the Pope to attack (1287).

Ladoga, the largest lake in Europe. In N.W. Russia, and bordering on Finland. The shores on the E. and

S. are swampy, but on the N.W. they are fringed by rocky islands. Its maximum depth is 720 ft., but the average depth does not exceed half this. The lake receives 70 rivers, of which the chief are the Svir, Taipale, Volkhov, and Syas. The water is pure and cold, and is frozen for c. 6 months of the year. Navigation is dangerous, owing to gales and fogs, but fishing is carried on extensively. The Stalin Canal (opened 1933) connecting the White Sea with the Baltic, passes through the lake. Area, c. 7005 sq. m.

Lady, see TITLES and COURTESY TITLES.

Ladybirds, small tortoise-like beetles, typically coloured red and black, of great economic value from their habit of feeding, especially in the larval stage, upon injurious plant-lice of various kinds. There are many different species beneficial to man in this way.

Lady Chapel, a structure dedicated to the Virgin Mary, and generally built as an appendage to cathedrals and churches of large size. Lady chapels are sometimes an elongation of the choir, extending eastward behind the high altar.

Lady Day, the 25th March, is the Feast of the Annunciation of the Blessed Virgin Mary. It is a quarter day in England and Ireland.

Lady's Mantle (or *Parsley Piert*), a common, inconspicuous weed belonging to the Rose family, with downy leaves and minute tufted greenish flowers.

Ladysmith, town in N.W. Natal, Union of S. Africa, and the commercial centre of the N. Natal coalfields. The town, strategically placed in the hilly region bordering the former Boer republics of Orange Free State and Transvaal, formed the base of Sir George White's operations in the early stage of the Boer War. Pop. c. 7000.

Ladysmith, Siege of (2nd Boer War) (Oct. 29, 1899–Feb. 28, 1900). Sir George White, with about 12,000 troops, was besieged in Lady-

smith by the Boers under General Joubert. Bombardment continued throughout the investment, and on Jan. 6 several thousand Boers under De Villiers made a strenuous attempt to force the lines, but were repulsed with a loss of 800 men. The town was relieved by General Sir Redvers Buller.

Lady's Slipper, name for orchids of the genus *Cypripedium*, of which one species is found rarely in the woods of the N. of England, while a number are grown in greenhouses.

Lady's Tresses, small orchid with a spike of fragrant white flowers flowering in Sept. and Oct. in dry pastures.

Læstrygones, in classical legend, gigantic inhabitants of ancient Sicily who wrecked the fleet of Ulysses and devoured the flesh of his comrades. Their king was Antiphates.

Lævo-rotatory, a term applied to optically active substances which have the power of rotating the plane of polarised light to the left. The optical activity of a compound is usually due to the presence in it of an asymmetrical carbon atom. See also STEREO-CHEMISTRY.

Lævulose, see FRUCTOSE.

La Farge, John (1835–1910), American painter, decorator and sculptor. He became President of the Society of American Artists, and published several books dealing with art, including a monograph on Hokusai.

La Fayette, Marie-Joseph-Paul, Marquis de (1757–1834), French statesman and soldier. He became a Major-General in the American Army (1776) and played an important part in the War of Independence. After 1778, he returned to France, though he paid several visits to America until the outbreak of the French Revolution in 1789. His love of democracy obtained for him important positions in the Revolutionary government; he was vice-president of the National Assembly and head of the National Guard. It was he who invented the tricoloured cockades of the Revolutionaries. But the Reign of Terror was repugnant to

him; he continually protested against its extreme acts, until at last he was proscribed as a traitor (1792). He fled from France and was imprisoned in Prussia and Austria until 1797. He returned to France in 1799, but after 1804 withdrew from public life until 1818, when he returned as the champion of Liberalism, becoming again, in 1830, head of the National Guard. He was deeply revered in America, where he was granted money and land, and where monuments were raised in his honour.

La Fayette, Marie Madeleine, Comtesse de (1634-1692), French novelist, was a friend of Madame de Sévigné and mistress of La Rochefoucauld. Her romances, especially *La Princesse des Clèves* (1678), foreshadowed the modern novel, as contrasted with the formless, artificial works of Mlle de Scudéry and her imitators.

Lafitte, Jacques (1767-1844), French statesman and banker, of humble birth, became one of the most powerful and popular Frenchmen of the 19th cent. He was head of the banking firm that bore his name, and a prominent Liberal. After the 1830 revolution, he was made Minister-President of the Government, and saved the country from disintegration, though at the price of his fortune and his popularity.

La Follette, Robert Marion (1855-1925) ("Fighting Bob"), American politician, founder of the Progressive Party (1912), and Governor of Wisconsin (1901-5). Under his governorship, Wisconsin prospered exceedingly. From 1905, he was a member of the Senate, and earned his nickname by his vigour and honesty.

La Fontaine, Jean de (1621-1695), French poet, author of the famous *Fables*, produced many fashionable ballads, stories, and epigrams before his translation of Terence's *Eunuclus* (1654) brought him to the notice of Fouquet, who gave him a pension. His most memorable work, however, consists of the delicately indelicate *Contes* (1666), and the *Fables Choisies mises en vers* (1668).

Laforge, Jules (1860-1887), French poet; through the offices of Paul Bourget, was made French Reader to Empress Augusta of Germany (1881-6). His poems are ironical and often morbid, and have been compared with those of Heine. They are mostly in *vers libres*, and had a great influence on his modern successors.

La Fronde, see FRONDE, LA.

Lagerlöf, Selma (b. 1858), Swedish authoress, won a prize for her *Gösta Berlings Saga* (English translation 1898), short stories of peasant life. Her other works include *Invisible Links* (1894), *Jerusalem* (1901), *The Adventures of Nils* (1906), and an autobiography (1924), and have earned her the reputation of being one of Sweden's best novelists. She was awarded the Nobel Prize for Literature in 1909, and in 1914 was elected first woman member of the Swedish Academy.

Lagos: (1) Part of the Colony and Protectorate of Nigeria (*q.v.*), formerly a separate colony, on the Gulf of Guinea. It is fertile but unhealthy, although sanitation measures have decreased fever. The chief export is palm oil; the usual agricultural products of W. Africa (cacao, coffee, cotton, rubber, etc.) are grown, and gum, ivory, and lumber are of some importance. Area, c. 28,000 sq. m.; pop. (almost wholly native) c. 1,800,000.

(2) A seaport of Lagos and the political capital of the Colony and Protectorate of Nigeria, near the mouth of the Ogun R. The only natural harbour along 1000 m. of coast, Lagos is an important port, and centre of the export trade of a considerable hinterland. There is rail communication with the interior; the Eastern Telegraph Company has a wireless station. Pop. c. 126,000 (Europeans number only a few hundreds).

Lagrange, Joseph Louis (1736-1813), mathematician; at the age of 18 he was appointed Professor of Geometry at the Turin Military Academy. In

1758 he founded the Turin Academy of Sciences, and by 1761 was recognised as the greatest mathematician of his time. His most important work is *Mécanique analytique*.

La Harpe, Jean François de (1739-1803), French playwright, was a friend of Voltaire. His tragedies were unsuccessful, with the exception of *Warwick* (1763), but his critical writings earned him great fame and some notoriety. His best work is his *Cours de littérature ancienne et moderne*. He also edited the *Mercur de France*.

Lahire, Laurent de (1606-1650), French painter, examples of whose work can be seen in the Louvre. The British Museum possesses a good specimen of his carefully executed drawings. Lahire was one of the founders of the Royal Academy of Painting and Sculpture in France, in 1646. He did much decorative painting.

La Hogue, Battle of (May 19-20, 1692). The French fleet under de Tourville was defeated and dispersed by the combined British and Dutch under Admirals Russell and Allemande. Two days later Admiral Rooke destroyed 16 of the French ships.

Lahore [LAHŌR'] : (1) Division of the Punjab, occupying the region immediately W. of the R. Sutlej, and extending from the neighbourhood of Multan to the outer ranges of the Himalaya. The division suffers greatly from the lack or uncertainty of rainfall, but by means of irrigation crops of cereals, cotton, opium, and tobacco are raised. Area, 24,870 sq. m.; pop. c. 5,467,000.

(2) City on the R. Ravi, the garrisoned capital of the Punjab. Industries are mainly concerned with the manufacture of luxury articles, gold and silver thread, metal-work, pottery, and textiles (especially silks and carpets). The Punjab university is in the city, which has also an Anglican cathedral. Pop. (1931) 429,700.

Laibach, Congress of, adjourned meeting of the Great Powers from the Congress of Troppau (q.v.) in 1821. The Congress approved the suppression

of the Italian revolution by Austrian troops; but while Great Britain held that this was a concern of Austria, Russia, Prussia, and Austria considered it was the duty of European Powers everywhere to suppress revolution. It marked the beginning of England's separation from the Quadruple Alliance (q.v.).

Lake District, the roughly circular mountainous area in Cumberland, Westmorland, and small part of Lancashire, defined by Morecambe Bay, Solway Firth, and the valleys of the Lune and Ribbles. The scenery of a type without parallel elsewhere in England. The limestones and coals measures which form the even contours of the Pennine Chain have been denuded in the Lake District, exposing a rugged system of volcanic peaks deeply scored by glacial valleys and ghylls. All the largest English lakes (Windermere, Ullswater, Derwentwater, Wastwater, etc.) are in this region, together with the loftiest peaks (Scafell Pike, Scafell, Helvellyn, Great Gable, and the Pillar). The Lake District is scantily populated, but is visited by a large number of tourists. It is a favourite centre for rock climbers. Wordsworth, Southey, Coleridge (the so-called Lake School), Gray, Shelley, Keats, De Quincey, and Ruskin are all associated with the Lake District. (See also CUMBERLAND, and WESTMORLAND.) Area, c. 700 sq. m. (See p. 184).

Lake Dwellings, see **STONE AGE**.

Lake Regillus, scene, near Rome, of a traditional victory of the Romans over the Latins (c. 497 B.C.); the last attempt of the mythical Tarquinian dynasty to recover the throne of Rome. All the sons of Tarquinius, and his son-in-law Mamilius, were slain, and legends state that the Romans (led by Aulus Postumius) were assisted at the critical moment by the twin gods Castor and Pollux, mounted on white horses.

Lakes, large expanses of water surrounded by land. They arise in several ways, of which the most

portant is the obstruction of a river valley by glacial action, landslip, or more rarely, lava-flow. Lakes formed in this way are liable to be emptied through bursting of the dam, and if this happens in stages the lake may occupy various levels before finally emptying. The parallel roads of Glen Roy are beaches deposited at successive levels by a lake formed by a glacial dam. Lakes may also be formed in depressions due to faulting, as in the region of the Great Rift Valley of Africa, in which the chief African lakes are situated; and circular lakes frequently occupy the craters of extinct volcanoes. Another type of lake is that which is due to the rise of the water-level in the soil, so that water occupies the low-lying ground as a lake with no visible outlet.

Lakes occur at all levels: Lake Titicaca is 12,500 ft. above sea-level; there are several lakes in Tibet at an altitude of 16-18,000 ft.; and the existence of a small lake near the summit of Mt. Everest was established during the flight over the mountain in 1933. On the other hand the Dead Sea is 1300 ft. below the level of the Mediterranean. The deepest lake is Lake Baikal, which reaches over 1000 fathoms in depth, and the largest freshwater lake is Lake Superior (31,200 sq. m.).

Lakes, coloured compounds formed between certain types of dyes and some metallic hydroxides. The dye used is insoluble in water, and the metallic hydroxides are used as mordants, with which the dye combines on the fabric, yielding a fast colour. The same dye may give different colours with different mordants. *See also* DYES; DYING.

Lake School of Poets, The, the name given, originally in derision, to the group of poets of which Wordsworth, Coleridge, and Southey were the most prominent members, who lived in the Lake District of England. The *Edinburgh Review* published in 1802 a derogatory article by Jeffrey directed against Southey. In this attitude,

which the *Edinburgh Review* maintained against all the Lake poets, it was supported by Byron. *Blackwood's Magazine* took up their defence with the powerful help of De Quincey, Lamb, Hazlitt, and Leigh Hunt.

Lakh, an Indian word for 100,000, usually rupees. It is commonly written Rs.100,000, and is worth at par £6,667 or \$50,000. *See also* RUPEE; CRORE.

Lalande, Joseph Jérôme Lefrançois, De (1732-1807), French astronomer, went to Paris to study law, but on meeting with Delisle his interest was drawn to astronomy and before he was 21 he became a member of the Academy of Berlin. In 1759 he published corrections of Halley's Tables. He did much to popularise the science of astronomy, and the Lalande Prize, which he instituted in 1802, is still annually awarded.

La Línea (or *La Línea de la Concepción*), a town in S. Spain, just N. of Gibraltar, for which it is an important source of supply for market-garden produce. Pop. 27,000.

Lalo, Edouard (1823-1892), French composer of the *Symphonie Espagnole* for violin and orchestra, a favourite work with violinists. Lalo himself was a violinist and wrote his best music for that instrument. His opera *Le Roi d'Ys* contains some charming music which Melba used often to sing. Lalo was born in Lille, but lived mostly in Paris, where he died.

Lamaism, the religion of Tibet, a syncretic cult which arose from the superposition of Buddhist philosophy and speculation upon the basis of an older animistic and devil-worshipping cult. Its centre is Lhasa, the capital, where the Grand Lama, the religious and political head of the State, resides. Social and religious institutions are perhaps more intimately mixed in Tibet than anywhere else in the world; most male Tibetans spend part of their lives in one of the monasteries of which the country is full. The Grand Lama has supreme control over all temporal matters; the Tesho lama

or Bogdo lama having a like control in matters spiritual. Next come the Chutuktus (abbots of the monasteries), and below them priests and clergy. This system of government was founded by the Lamaist reformer, Tsong-kha-pa, in 1355. His influence was considerable; he founded three monasteries in Lhasa besides others

Lamarckism, theory of the inheritance of characteristics acquired during the life-time of an individual, called after Lamarck (*q.v.*).

Lamarckism provides an apparently obvious explanation of evolution (*q.v.*), but there is lack of evidence for its acceptance.

The evidence of palæontology (*q.v.*)



A Group of Lama Dancers.

in other parts of the country, and wrote innumerable works. Reincarnation plays a large part in the creed, and the worship is accompanied by an elaborate ritual which led early Christian missionaries to suppose that the religion of Tibet was a Satanic parody of Catholic Christianity. (See p. 185.)

Lamarck, Jean Baptiste (1744-1829), distinguished French zoologist. His fame rests mainly on his theory of the evolution of animals, known as Lamarckism (*q.v.*) or the Lamarckian theory.

shows that changes adapting the animal to its environment actually did occur; and modern disciples of Lamarck believe that if a habit be formed by a parent, the offspring more readily form the habit in the environment evoking its formation, and that change of habit leads to change of structure; most biologists consider this still unproven. See also GENETICS; HEREDITY.

Lamartine, Alphonse de (1790-1869), French poet, one of the greatest of the French Romantics, earned

mediate fame with his *Premières Méditations Poétiques* (1819). *Nouvelles Méditations* (1823), *Harmonies* (1829), *Jocelyn* (1836) and *La Chute d'un Ange* (1838) are his other best-known works. His writings include novels and several historical works. He took some part in politics, and was a member of the Government after the 1848 Revolution.

Lamb, see SHEEP BREEDING.

Lamb, Charles (1775-1834), English essayist, was born in the Temple, London, where his father was a server, and educated at Christ's Hospital. In 1792 he became a clerk in the India House, and there remained until his retirement in 1825. His life was made difficult by attacks of insanity suffered by his sister Mary who, in 1796, killed their mother, and by his fears for his own sanity. His early works include some contributions to Coleridge's *Poems on Various Occasions* (1796), and to *Blank Verse* (1793), a joint production with Charles Lloyd. A tragedy, *John Woodvil* (1802), and a farce, *Mr. H.* (1803), were unsuccessful; but the *Tales from Shakespeare*, which he wrote with his sister Mary (1807), established their fame. His essays appeared in the *Reflector*, *Gentleman's Magazine*, and *The London Magazine* (founded 1820). These were collected and published as the *Essays of Elia* (1823) and the *Last Essays of Elia* (1833). It is on these essays that his reputation rests. Their charm, humour, lightness of touch, and their revelation of Lamb's engaging personality have made them universally popular, for whimsical fancy and delicate pathos they remain unsurpassed. Equally amusing and fascinating are his *Letters*, written to such men as Wordsworth, Southey, Hazlitt, Coleridge, and Leigh Hunt.

Lamb, Henry, (b. 1895), British artist. He was educated at the Manchester Grammar School and studied art in Paris. A member of the New English Art Club, his early work was notable for the fine draughtsmanship and clarity of design—qualities which

were also evident in the works which were inspired by his service in France and Palestine during the World War. He is represented in the Tate Gallery.

Lamb, Sir Horace (b. 1849), English scientist. Educated at Trinity College, Cambridge, he became second Wrangler and second Smith's prizeman. He is recognised as an authority on hydrodynamics, and has done valuable research work on wave motions and electricity. Knighted, 1931.

Lamballe, Marie Thérèse Louise of Savoy, Princesse de (1749-1792), was a close friend and attendant of Marie Antoinette. Though the Queen did not always treat her honestly, she remained so loyal to her that she was regarded with particular hatred by the revolutionaries. She was beheaded for refusing to abjure her monarchical sympathies.

Lambermont, Auguste (1810-1905), Belgian statesman, and official in Ministry of Foreign Affairs, 1842-1905. Succeeded in freeing R. Scheldt from Dutch levies on Belgian trade at Brussels Convention, 1863. Represented Belgium on Congo and Slave Trade enquiries, and other conferences.

Lambert, Constant (b. 1905), musician, prominent among young English composers, was born in London. His first success was with his music for the ballet *Romeo and Juliet*. He has also written *Rio Grande* for chorus, piano, and orchestra, in which a jazz idiom is freely employed, and the music for the ballet *Pomona* (1927).

Lambeth, metropolitan borough in the administrative county of London, on the Surrey side of the Thames facing Westminster. There are important local chemical and pottery industries. Lambeth Palace has, since the latter part of the 12th cent., been the London residence of the Archbishops of Canterbury; the present building is mainly of the 19th cent., but the crypt beneath the Chapel dates from c. 1160, and the Lollards' Tower (originally a water-tower and subsequently the Bishop's prison) from

1435. There is a 16th-cent. gatehouse. Pop. (1931) 296,200.

Lambeth Conferences, assemblies of Anglican bishops of the Empire and the United States which are held periodically at Lambeth Palace. The idea of such meetings was first suggested by Bishop Hopkins of Vermont to the Archbishop of Canterbury in 1856. The first Lambeth Conference was held in September 1867, only 70 bishops out of 144 attending. The second Conference took place in 1878 under the presidency of Archbishop Tait. One hundred bishops attended. The third Conference in 1888 showed a great increase in attendance, and it occupied twenty-five days. Further Conferences took place in 1897, 1908, 1920, and 1930, the chief subjects discussed at the last being: (1) Theology: the Doctrine of God; (2) Social: Sex,



Lambeth Palace, London.

Birth Control, Racial Equality, and Peace; (3) Unity with the Eastern Orthodox, the Old Catholic, and the Free Churches.

Lamb's Skin, See ARNICA.

Lamellibranchia, a class of the Mollusca (q.v.), distinguished by the shell being bivalved, and by the absence of a head and "radula." Typically, the body is bilaterally symmetrical and the valves alike. They are joined above by an elastic ligament which opens them, but they can be closed by one or two muscles, the position of which is marked by a scar on the inside of the shell. The shell covers the mantle and a line on it

marks the attachment of the mantle to it. Between the mantle flaps and the foot, which is usually shaped for burrowing in the mud, are suspended the plate-like gills. But the function of the gills is as much nutritive as respiratory. A few lamellibranchs are found in fresh water, but they are mostly marine, living at the bottom of the sea or between tide marks.

Lamellibranchs were in existence in the Upper Cambrian, almost the earliest fossiliferous rocks.

Lamennais, Hugues Félicité Robert de (1782-1854), French priest and philosophical writer. The effect of his great work *Essai sur l'indifférence en matière de Religion* (1817) was electrical. In it he violently denounced religious toleration and pleaded for Catholic restoration. Lamennais, however, broke from the Church when the Pope refused his support to Lamennais's paper *L'Avenir*. This step reversed all his previous convictions, and he represented the Left in the Assembly at the 1848 revolution. His strong democratic principles sustained a severe blow on the accession of Napoleon III, and he retired to work on a translation of Dante until his death.

Lamentations, Book of, one of the books of the Old Testament included in the Five Rolls or Megilloth. There are five lamentations in the book, all of them concerned with the destruction of Jerusalem. It is generally held that Jeremiah composed the second and fourth chapters, and that the first third, and fifth were written by some of the prophet's disciples.

Lamia, in Greek mythology, was the mother, by Jupiter, of several children, whom Juno, in her jealousy, stole from her. She became insane in her grief, and developed into a child-murderer. This legendary figure had many manifestations; she was thought of as a monster, as a serpent with a woman's body, and as a vampire. She is the central figure of Keats's poem of that name.

Lammas Day (August 1), so called probably from the Anglo-Saxon *Ilaf-Masse*, "loaf-Mass," as marking the day on which the firstfruits of the harvest were blessed at Mass. It is still marked in the English Prayer-book Calendar, though no special religious ceremonies are now associated with it.

Lammergeier (*Lamb Vulture*), one of the largest birds of prey, intermediate in some respects between the eagles and vultures; it inhabits the mountain chains of S Europe and Central Asia. It has a tuft of bristly feathers on the lower jaw, from which it is often known as the Bearded Vulture. The Lammergeier nests in precipitous places and usually lays a single egg in Feb.

Lamont, Thomas William (b 1870), American banker, born at Claverack, N.Y., and educated at Harvard. After two years on the *New York Tribune*, he joined the Bankers' Trust Company as secretary and treasurer, and in 1903 became vice-president. He was then vice-president of the First National Bank of N.Y. until he entered J. P. Morgan and Company. In the World War he helped to float Allied loans, and from 1918 to 1922 controlled the *New York Avenue Post*. He became chairman of the International Committee of Bankers, and in 1933 was chosen as a member of Roosevelt's advisory "Brain Trust."

Lamoureux, Charles (1834-1893), French conductor and founder of the famous Lamoureux Concerts of Paris, at which so many famous artists and works were heard for the first time. He played in the orchestra of the Opera, later becoming conductor at the Opera Comique. He instituted his concerts in 1861, and frequently brought his orchestra to London after it had been successfully launched in Paris.

Lamplack, see **CARSON**; **CARSON**.

Lampedusa, small island owned by Italy, midway between Sicily and the coast of Tunisia. There are the re-

main of prehistoric hutments, as well as memorials of ancient Rome and Carthage on the island, which is at present an Italian penal settlement. Pop. c. 2000.

Lampeter (or *Lampeter Pont Stephen*), a municipal borough and market town of Cardiganshire, situated some 25 m E of Cardigan, chiefly famous as including St David's College, which was established in 1627 as a training college for those wishing to enter the Episcopal Church and can grant the degrees of B.D. and B.A. Pop. 2500.

Lampoon (*LAMP'DON*), name given to a piece of violent and unscrupulous personal invective or satire in prose or verse. The best examples in English will be found in the works of Swift and Charles Churchill.

Lamprey, usually regarded as a fish, is now classified with the hag-fish (q.v.) in a group apart from the rest of the vertebrates, because it has no true jaws and no limbs, and exhibits many primitive characters lacking the fishes with lower forms like the lance-

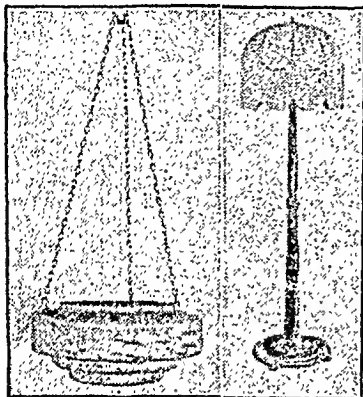


Lamprey

let (q.v.), the larger for instance, feeding like the latter animal and the sea squirts (see **DETERMINATE SYSTEM**). Lampreys are mostly marine, but ascend rivers to spawn. They are found all over the world, but the best known are two species found in Great Britain; the sea lamprey, which may be 3 ft. long and the fresh-water lamprey, or "Lampers," which is about half that length. Both were formerly common and so.

Lampshades, shades over all types of lights. For use in the home they may be made of vellum, parchment, parchment paper, or a translucent may be coloured with special stains or special lampshade colours. The design outlined with a draw on silk shades, specially prepared silk to prevent it sticks from running through the glass

of the material. The design may also be painted in oils, but these are transparent.



Lampshades of Alabaster and Silk as used for Electric or Gas Lighting.

Lanarkshire, county of the S.W. Scottish lowlands with a small coastline, and corresponding practically with the basin of the R. Clyde and its tributaries. The N. part lies at a low level, but in the S. it rises to the Lowther Hills, in which are a number of summits over 2000 ft., Green Lowther (2400 ft.) being the highest. The Falls of Clyde are near Lanark. Industrially and agriculturally Lanarkshire is the most important Scottish county. Farming is highly specialised and conducted with remarkable skill and patience. Oats are the main cereal crop; root crops are extensively cultivated; market-gardening, dairy farming, and fruit growing are of considerable importance. The strawberry fields produce a prolific crop. Sheep and pigs are raised, and large herds of cattle, while the Clydesdale draught horses are celebrated. Industry centres around the coal and iron fields near Glasgow (*q.v.*), the key occupations being mining, shipbuilding, engineering, and textile manufactures. Principal industrial towns are Glasgow, Hamilton, Govan, Partick, Coatbridge, Motherwell, and Airdrie.

Lanark, the county town, is small, and is chiefly notable for its associations with Wallace, and for the beauty of its scenery. New Lanark, near by, is interesting as the scene of Robert Owen's Utopian industrialist experiments. Area, 880 sq. m.; pop. 1,585,968.

Lancashire, a palatine county of N.W. England, occupying the area W. of the Pennine Chain between the valleys of the Mersey and the Lune, together with the peninsula of Furness, separated by Morecambe Bay from the rest of the county. The coast is flat and low-lying, and deeply indented by the estuaries of the Lune, Ribble, and Mersey. Among other rivers are the Duddon (in Furness) and the Irwell, which flows through Manchester and helps to feed the Manchester Ship Canal (*q.v.*). The district of Furness is mountainous (Conistown Old Man, 2633 ft.); in the W. the surface is hilly, rising to the Pennine moors.

Industry. Lancashire is one of the most important industrial areas in Great Britain. A large coalfield and a climate peculiarly suitable to cotton spinning made S. Lancashire for over a century the principal centre of the cotton industry, which in turn has given rise to a number of important associated industries, such as the manufacture of textile machinery and the various chemicals associated with dyeing. Minor textiles manufactured in Lancashire are jute, silk, woollens, and worsted. N. Lancashire's valuable deposits of hematite iron-ore have given rise to the great steel industry of the Barrow-in-Furness district. Other industries include glass, wire, paper, and tobacco manufacture.

Population. Lancashire is the most densely populated county in Great Britain. The great concentration of population is in the trading centres of Manchester and Liverpool (*q.v.*) and in the coal and cotton towns of the S.E. Wigan is the centre of the coalfield; the cotton towns are fairly clearly differentiated into an inner group of weaving and an outer ring of

or distinct brain, but it has a solid elastic rod, running along its whole length, and known as the notochord, which is a forerunner of the vertebrate spinal column. The lancelet is important as being a link between the vertebrates and invertebrates. It forms a class of its own, the *Cephalochordata*.

Lancelot, Sir, a comparatively late-comer in the Arthurian cycle of romance, quickly usurped the position of Gawain as the flower of Arthur's chivalry. His love for Arthur's Queen, Guinevere, led to war and the final disruption of the fellowship of the Round Table.

Lancers, see **LANCH**.

Lancewood, any wood suitable for carriage shafts, hence different trees are given this name in different countries. The black lancewood tree of the Guianas gives taper poles 30 ft. long and only 8 in. in diameter at the thickest end.

Lancaster, Henry Vaughan (b. 1863), English architect, was elected F.R.I.B.A. in 1906, and became Vice-President in 1913. For some time he was Editor of *The Builder*, and advised a number of provincial Governments in India on town-planning. The best-known of his buildings are the Central Hall at Westminster, and the City Hall and Law Courts at Cardiff.

Lancret, Nicolas (1600-1743), French painter, who was greatly influenced by Watteau. Fragonard was much influenced by his work. Many of his drawings in red chalk are very charm-

ing. In the Wallace Collection and excellent specimens of his work, the National Gallery possesses four of his paintings, a series entitled *Four Ages of Man*.

Landau, a four-wheeled vel horse-drawn, and with a sole leather hood (see **BROUGHAM**; **Cou**).

Landen, see **NEERWINDEN**.

Landen, John (1719-1790), English mathematician, discovered Lande point and Landen's transformatio (in elliptic functions) and formulat Landen's theorem (1775). His chief wo is his *Mathematical Memoirs* (1780-1

Landes [**LANND**]: (1) A French d partment on the Bay of Biscay, fro the mouth of the Adour to Etang d Cazaux, bounded E. by the depart ments of Gers and Lot et Garonne. The greater part of the interior is an infertile region of sand dunes and forest. There is no important seaport. The local breed of horses is celebrated. Mont de Marsan (the capital) and Dax (a spa) are the chief towns. Area, 3600 sq. m.; pop. 263,000.

(2) An extensive tableland of S.W. France, N. of the Adour, comprising most of Landes department and a large part of the departments of Gironde and Lot et Garonne. Large tracts of marsh have been reclaimed by an elaborate system commenced in the 18th cent. A feature of the coastal region is the long chain of lagoons (étangs) behind the dunes. Area 5500 sq. m.



